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Table of Contents

Cultural Heritage

Buychik, A., Tomanek, A. From the creation of the present to the future heritage: Digital, hybrid and intangible artifacts as future objects of klironomy — scenarios, ethics and criteria of anticipatory interpretation 7

History

Ivonina, L.I. Representation of the Peace of Utrecht 1713 in English poetry 26

Jurisprudence & Law

Gontar, N.N. Hybrid justice in the Russian Federation, 2020–2025: The impact of the link between e-justice, court-annexed mediation and ODR on the quality of judicial reasoning and the stability of judgments in appeal and cassation (micro-level NLP analysis and quasi-experiment) 46

Medicine & Pharmaceuticals

Romanova, N.A. Use of biofeedback technologies in female pelvic floor muscle rehabilitation: Clinical outcomes and neurophysiological effects 67

Pedagogics

Khozhalova, I.N. Moral and ethical education of schoolchildren: Problems and solutions 98

Mariach, A.Y. Fostering students' independence in the context of musical-instrumental training at a pedagogical university 120

Philosophy

Bakhtin, M. Metaphysical principles of causality and normativity in historical cognition 135

Buychik, A. Cultural heritage as a self-organising system: The philosophy of klironomy and the formation of a new science of cultural preservation in the 21st century 153

Alikulov, A. The hypothesis of the Unified Matrix of the Universe 175

Dyachenko, O.N. The natural world as an explication of ethical and axiological meanings in Greco-Eastern patristics 193

Geltser, Y.G. General laws of nature, society, and thought as the philosophical foundation of the general systems theory in the methodological approach to cognizing the world: A philosophical solution to the physical-mathematical theory of strings 202

Authors 235

Citations in APA 236

Alexander Buychik [a][1], *Anisiia Tomanek* [b][2]

From the Creation of the Present to the Future Heritage: Digital, Hybrid and Intangible Artifacts as Future Objects of Klironomy — Scenarios, Ethics and Criteria of Anticipatory Interpretation [1]

Abstract:
The relevance of this study is determined by the transformation of the concept of cultural heritage in the twenty-first century, whereby it ceases to be a static object of conservation and becomes a dynamic process of anticipatory selection. Under conditions of digitalisation, cultural hybridisation, and the growing significance of intangible creative forms, the boundaries between the past, present, and future have become permeable, requiring a new theoretical and methodological framework. The study focuses on developing klironomy — a metadisciplinary field concerned with the continuity of cultural being — which interprets heritage as a process of self-organisation and the projection of future meanings. The scientific novelty of the study lies in the formulation of a klironomical model for identifying and interpreting cultural phenomena as potential objects of future heritage. For the first time, the concepts of heritage futures, digital and intangible heritage, the philosophy of culture, and the ethics of selection are integrated into a unified system explaining the mechanisms of cultural continuity. An original typology of future klironomical objects is proposed, along with a model of anticipatory interpretation criteria encompassing temporality, cultural innovation, social resonance, technological sustainability, and ethical admissibility. The subject of the study is the contemporary human being as the bearer and creator of cultural meanings, determining which phenomena of today will become the heritage of tomorrow. The object of the study comprises material, intangible, and *born-digital* forms of culture considered in their potential for continuity. The study aims to elaborate the theoretical and methodological foundations of klironomy and to develop a model of interpretation applicable to the assessment of digital and hybrid artefacts. The methodology combines philosophical, cultural, and sociotechnical approaches through interdisciplinary synthesis, systemic and comparative analysis, content analysis of scientific and regulatory sources (UNESCO, ICCROM, PERSIST), and scenario-based modelling (foresight). This approach made it possible to conceptualise heritage as a self-organising system that unites processes of meaning-generation with the technologies of preservation. The results include a clarification of the conceptual field (*heritage futures*, *born-digital*, *intangible heritage*, *klironomy*), the development of a matrix typology of future heritage objects, and the identification of four scenarios for their formation — conservative, innovative, hybrid, and networked. The proposed klironomical model of criteria was tested on examples of digital art, virtual museums, and craft communities. The authors conclude that the contemporary and the new can be regarded as future heritage objects when interpreted through the lens of klironomy. Klironomy is thus affirmed as an integrative framework that unites philosophy, cultural studies, technology, and ethics into a coherent system of knowledge on the continuity of cultural being, opening perspectives for museum, educational, and research practices aimed at preserving the future through a reflective present.

Keywords: klironomy, future cultural heritage, heritage futures, born-digital artefacts, intangible heritage, hybrid culture, anticipatory interpretation, cultural continuity, digital heritage, ethics of cultural selection.

Abbreviations:

ICH is intangible cultural heritage.

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Introduction

In recent decades, the concept of cultural heritage has moved beyond the classical understanding of monuments and traditional artefacts, transforming into a complex interdisciplinary construct that encompasses not only material objects from the past but also contemporary cultural phenomena—both physical and digital—as well as the dynamic practices of intangible culture. This transformation arises from the fact that contemporary artefacts and practices, originally created as expressions of the "present", acquire the potential for future continuity, becoming objects of cultural memory for generations to come. The problem of anticipatory interpretation of such phenomena is not only theoretical but also practical, since criteria of selection determine academic, restoration, and policy decisions. In this context, the conceptual paradigm of *heritage futures* offers a rethinking of heritage as a process of shaping and projecting future values rather than merely recording the past (*Harrison et al., 2020a*; *Harrison et al., 2020b*; *Holtorf, 2024*).

Contemporary challenges are linked to the accelerated digitalisation of cultural life, the emergence of born-digital artefacts, hybrid creative forms, and the representation of intangible practices in media and social environments. Within this landscape, traditional mechanisms of selection and preservation have lost their adequacy, as they remain focused on historical objects and physical carriers. At the same time, the practices of intangible cultural heritage, recognised in international conventions (*Convention…, 2003/2022*), demonstrate that living tradition is not only "what has been", but also what can be maintained, developed, and reproduced through social practices and communication. Consequently, there arises the need for a theoretical and methodological framework that could integrate the principles of *heritage futures*, digital and intangible heritage, and introduce the notion of *klironomy* as a metadiscipline of cultural continuity. In this study, klironomy is understood as a science of anticipatory interpretation of cultural phenomena with the purpose of their potential future canonisation.

The relevance of the study is defined by several factors. First, global processes of digitalisation and media transformation have generated phenomena that do not fit within the traditional categories of cultural heritage, yet may become objects of future memory. Second, methodological approaches to the selection of future heritage objects remain underdeveloped and lack a coherent theoretical model, which limits their applicability in practice. Third, the shift from a conservative preservation paradigm to an anticipatory one requires a new ethical and epistemological foundation capable of reflecting the complexity of contemporary cultural forms and social practices. The results of this study are significant not only for theorists in cultural studies and philosophy of art but also for practitioners in museums, archives, cultural heritage policy, and education.

The novelty of the study lies in developing theoretical and methodological foundations for the klironomical interpretation of digital, hybrid, and intangible artefacts as potential objects of future heritage. Unlike existing studies that either focus on material monuments of the past or describe the preservation of born-digital artefacts without philosophical reflection, the proposed conceptual framework unites anthropocentric, technological, and sociocultural perspectives into a unified model of anticipatory selection and interpretation. This enables the consideration of contemporary creativity and cultural practices as elements of dynamic continuity capable of enriching future cultural memory.

The subject of the study is the system of professionals—heritage researchers, art theorists, philosophers of culture, and museum practitioners—whose activities are directed towards the interpretation and selection of cultural phenomena for future continuity.

The object of the study comprises contemporary cultural phenomena, including born-digital artefacts, hybrid artistic forms, and dynamic intangible practices, which may be actualised as future objects of klironomy.

The study aims to develop a theoretical and methodological model for the anticipatory interpretation of contemporary cultural phenomena—digital, hybrid, and intangible—as potential objects of future cultural heritage.

This purpose is achieved through the following objectives:

- define the current state of heritage futures theory and its relation to klironomy;
- analyse the conceptual frameworks and criteria for identifying born-digital, hybrid, and intangible phenomena;
- develop a model of anticipatory selection with an ethical dimension;
- propose practical guidelines for implementing the developed model in scholarly and professional practice.

The significance of the research results manifests in several dimensions. Theoretically, the proposed model expands the philosophical foundations of heritage studies by introducing klironomy as a meta-construct of continuity. Methodologically, it provides a systematic toolkit for selecting and interpreting phenomena that traditionally fall outside classical heritage frameworks. Practically, the findings can be applied by museum specialists, archivists, creative industries, and educators in developing strategies for working with contemporary cultural phenomena. Finally, for students and early-career researchers, the study offers a framework for integrating philosophical, cultural, and technological approaches to the analysis of complex cultural artefacts.

Methods

In contemporary humanities, the study of cultural heritage requires a wide spectrum of scientific methods that ensure a comprehensive understanding of the investigated phenomenon. Research on the anticipatory interpretation of digital, hybrid, and intangible cultural forms as potential future heritage cannot be conducted without the use of both general scientific and specialised methods inherent in cultural studies, philosophy of culture and art, media theory, and digital humanities.

At the general level, the historical-logical method plays a leading role, enabling the reconstruction of the evolution of the concepts of "heritage", "culture", and "art", and their transformation in the modern context. It allows for identifying how traditional categories of cultural heritage relate to new phenomena within digital and hybrid cultural environments and how the very notion of continuity changes over time. The historical-logical approach is particularly useful for comparing international policies, normative frameworks, and theoretical paradigms such as *heritage futures*, as reflected in documents of UNESCO/PERSIST (*The UNESCO…, 2016*; *The UNESCO…, 2021*) and ICCROM (*Anticipating Futures for Heritage, 2023*).

A comprehensive systems analysis makes it possible to treat cultural heritage not as an isolated entity but as an interrelated complex encompassing material, intangible, and digital dimensions. This method facilitates the identification of structural interconnections among the components of the cultural field and models of future heritage, which is especially important when analysing hybrid and born-digital phenomena that transcend disciplinary boundaries. It also allows the integration of social practices, media representations, and digital networks into the study of cultural memory formation.

A key methodological instrument is conceptual analysis, ensuring the establishment of a clear theoretical vocabulary. The notions of klironomy, anticipatory selection, born-digital, hybrid artefacts, and temporal continuity require definitional clarification and correlation with existing discourses in cultural studies, philosophy of culture, and media theory. Conceptual analysis helps delineate semantic boundaries, identify internal relations, and reveal ambiguities and contradictions, thereby strengthening the epistemological coherence of the study.

Qualitative content analysis, focused on the systematisation of scholarly publications, policy documents, and case studies, is employed to detect dominant themes, methods, and arguments in the literature on heritage futures, digital preservation, and intangible heritage. This approach reveals both the empirical scope and typological tendencies of current debates, exposing conceptual gaps and emerging directions. It provides the basis for constructing a matrix of criteria for the anticipatory selection of potential heritage objects.

Among the specialised methods typical of cultural studies and philosophy of art, comparative analysis plays a vital role. It enables the correlation of diverse cultural practices and digital phenomena with existing heritage models and the identification of diagnostic properties that may serve as indicators for inclusion in future heritage registers. Comparative analysis also integrates cultural, social, and technological parameters that determine the durability and continuity of cultural forms.

The phenomenological approach, drawn from the philosophy of art and cultural theory, allows the exploration of lived experience among participants of cultural practices, creators of digital and hybrid artefacts, and their audiences. This approach reveals the non-material dimensions of continuity, which are embedded not in physical media but in emotions, meanings, and social relations. It further illuminates the value foundations upon which practices of preservation and transmission are built.

Methods of futurological research, including *foresight* and scenario modelling, play a pivotal role in constructing an anticipatory model of selection. These methods enable the systematic analysis of potential trajectories in the evolution of cultural practices and technological environments, assessing not only current features but also the long-term sustainability of phenomena. Scenario modelling helps to identify alternative futures for heritage and to evaluate their plausibility, risks, and ethical implications.

When analysing born-digital resources and hybrid forms, digital methodologies are applied, encompassing the analysis of digital traces, platform data, and media realisations. These tools provide access to empirical materials unavailable through conventional archival sources, allowing the assessment of the dynamics of cultural processes occurring in digital environments. In combination with qualitative approaches, digital analysis reinforces the empirical foundation of anticipatory interpretation.

Specialised methods of the philosophy of culture and art, such as semiotic analysis and critical theory, assist in deconstructing cultural symbols, codes, and practices, uncovering their meaningful structures and long-term cultural potential. They are particularly relevant for hybrid artistic forms where distinctions between medium, form, and meaning become blurred.

Thus, the proposed methodological strategy is oriented towards interdisciplinary integration, ensuring a comprehensive understanding of phenomena related to future heritage. The combination of general and specialised methods makes it possible not only to describe current cultural transformations but also to construct a theoretically consistent, empirically grounded, and practically applicable model of anticipatory interpretation of cultural phenomena that responds to the challenges of contemporary cultural evolution.

Literature Review

The core theoretical foundation of this study lies in the works of Rodney Harrison, who marked a decisive shift from a retrospective to a prospective understanding of heritage. His monograph *Heritage Futures: Comparative Approaches to Natural and Cultural Heritage Practices* (*Harrison, 2020a*) synthesises the results of a major interdisciplinary project and conceptualises heritage as a system of managerial decisions concerning the future of cultural values. Earlier, Harrison had articulated the "ontological politics" of heritage in the age of the Anthropocene, extending beyond the traditional dichotomy of "natural" versus "cultural" and reframing heritage as a field of multiple temporalities and communities (*Harrison, 2015*). His 2016 article delineated the concept of *heritage futures* as a programmatic statement, laying the groundwork for a more comprehensive theoretical argument (*Harrison et al., 2016*). In collaboration with Sterling, Harrison further developed the idea of "deterritorialising the future", showing how cultural and natural trajectories blur the boundaries of disciplines and institutions (*Harrison & Sterling, 2020*).

The communicative and social dimensions of this shift toward the future are elaborated by Cornelius Holtorf. In one article, he addresses the "climate heritage paradox," highlighting the need to adapt archaeological heritage to environmental change without compromising the diversity of future options (*Holtorf, 2024*); in another, he engages in a meta-discussion of the concept of *heritage futures* itself, emphasising its dialogical and scenario-based character (*Holtorf & Bolin, 2024*). Collectively, these studies establish a methodological and ethical transition from the conservationist to the anticipatory paradigm, in which not only the artefacts and traces of the past but also present-day choices about future continuity acquire decisive importance.

The classical cultural critique of heritage "objecthood" developed by Laurajane Smith remains fundamental. Her seminal book *Uses of Heritage* demonstrates that heritage is not a self-evident "thing" but rather a socially embedded process and practice (*Smith, 2006*). This argument resonates directly with the klironomical understanding of continuity as a meaning-producing relationship between the present and the future.

The body of research on intangible cultural heritage (ICH) reinforces this dynamic and processual understanding of continuity. Kirshenblatt-Gimblett (*2004*) conceptualised ICH as a form of "metacultural production" shaped by representational contexts and institutional frameworks. Hafstein (*2008*) traced how UNESCO's "masterpieces" programmes evolved into listing mechanisms that institutionalise canon formation. These analyses find normative grounding in the 2003 UNESCO Convention and its updated *Basic Texts* (*Convention…,*

2003/2022), which assert communities' rights to define, maintain, and transmit their own practices. For the present study, the procedural and communal dimensions of ICH provide a natural point of convergence for developing anticipatory interpretation.

The paradigm shift toward studying the "present as future" in archaeology was initiated by Victor Buchli and Gavin Lucas in their edited volume *Archaeologies of the Contemporary Past* (*Buchli & Lucas, 2001–2002*) and its introductory essay, which articulated an "archaeology of fast history" centred on the materiality of everyday life (*Buchli & Lucas, 2001*). For klironomy, this is crucial because it challenges the monopoly of "deep time", granting contemporary material culture the right to archaeological—and hence heritage—reflection.

In the realm of born-digital heritage, UNESCO's normative framework is pivotal. The *Charter on the Preservation of Digital Heritage* (*2003*) formally introduced the category of "digital heritage" and recognised its long-term significance. Practical criteria for selection and preservation were elaborated in the *PERSIST Guidelines* (*The UNESCO…, 2016*) and further adapted for the professional library and archival community (*The UNESCO…, 2021*). These documents provide the operational foundation for assessing "technological sustainability" and "digital representativeness".

The artistic and museological dimensions of digital variability were explored by Rinehart and Ippolito, who reconceptualised preservation as a "reassembly" of meanings and relationships rather than the fixing of a single version (*Rinehart & Ippolito, 2014*). Historically, the *Variable Media Approach* collection laid the foundation for such strategies (*Depocas et al., 2003*), while Rothenberg's early work (*2000*) established emulation as a technique for "experiencing" digital artefacts on future technological platforms. Together, these studies form a pragmatic framework for understanding born-digital heritage as living through migration, emulation, and documentation of intent.

Discussions on the future of collecting underscore the need to rethink museum acquisition policies. Knell's *Museums and the Future of Collecting* (*2017*) frames debates on destabilising canonical hierarchies and integrating unstable or processual forms of art. The earlier edition (*Knell, 1999/2004*) remains significant for tracing the historiography of these debates. Bruce Altshuler's edited volume *Collecting the New* (*2005*) exposes the dilemmas faced by contemporary art museums when incorporating non-canonical and emergent objects. These contributions directly support the klironomical notion of "anticipatory selection", whereby museums are challenged to engage with incomplete, fluid, and evolving histories of artefacts.

At the policy and strategic level, three recent documents define the institutional horizon of heritage futures. The ICCROM *Horizon Scan* report (*Anticipating Futures for Heritage, 2023*) synthesises global threats and opportunities, emphasising climate adaptation, digital transformation, and the need for foresight methodologies. The ERRIN/CHARTER Alliance report (*Dynamics…, 2024*) outlines future scenarios for the European heritage sector, highlighting cross-sectoral cooperation and skills development. The ARCHE Consortium report (*Future Trends…, 2023*) consolidates research and innovation agendas, with born-digital heritage, immersive technologies, and community engagement among its priorities. Regular *Heritage and Foresight* bulletins by ICCROM (*Heritage and Foresight, 2022*) provide "early signals" and evidence of the growing institutional recognition of anticipatory approaches. These sources

collectively supply the empirical foundation for the scenario-oriented component of this research and confirm the policy relevance of the klironomical perspective.

Alongside these theoretical and managerial works, infrastructural standards also play a decisive role. The OAIS reference model (*Reference Model…, 2024*) and its ISO counterpart, ISO 14721 (*2025*), define the terminology, roles, and processes for long-term digital preservation. These standards translate the klironomical criterion of "technological sustainability" into operational procedures—SIP, AIP, and DIP packages, metadata management, and preservation planning—serving as the structural backbone for connecting philosophy and practice in digital heritage.

The methodological foundations of foresight necessary for klironomical research are established in the collective volume *Transforming the Future* edited by Miller (*2018*), which formalises the concept of *futures literacy*—the capacity to think in multiple futures and to use anticipatory knowledge to shape present choices. Mangnus et al. (*2021*) expand this concept empirically, demonstrating the diversity of approaches to developing futures literacy and its applicability to cultural planning. These works justify the integration of scenario-based and probabilistic reasoning into our interpretive framework.

The theoretical and methodological structure of klironomy itself is articulated in a body of works by the co-author of this study. His early work *Klironomy—the Science of the Preservation of Historical and Cultural Heritage* introduced the term and argued for a meta-disciplinary synthesis of legal, cultural, and managerial approaches (*Buychik, 2019*). The English-language version positioned the concept within international discourse. Subsequent work on the formation of "*klironomical thinking*" shifted the focus toward epistemology, examining how collective and expert mental frameworks shape continuity (*Buychik, 2021*). Later studies (*Buychik, 2024a*) specified the methodological apparatus of klironomy—object typologies, interpretative parameters, and evaluation principles. The collaborative article with Tomanek (*Buychik & Tomanek, 2024*) introduced an economic and managerial dimension, while the expanded monograph *Klironomy: The Science of Cultural Heritage* (*Buychik, 2024a*) consolidated the conceptual system and methodological toolkit. Together, these works bridge the gap between *heritage futures* theory and heritage management practices, establishing klironomy as a connecting meso-level framework.

In summary, the literature demonstrates a collective movement from retrospective to anticipatory governance of cultural continuity. The contributions of Harrison (*2015*; *2016*; *2020a*; *2020b*), Harrison and Sterling (*2020*), and Holtorf (*Holtorf, 2024*; *Holtorf & Bolin, 2024*) provide the philosophical foundation of this shift, while Smith (*2006*) offers a critical redefinition of heritage as practice. Research on intangible heritage (*Convention…, 2003/2022*; *Kirshenblatt-Gimblett, 2004*; *Hafstein, 2008*) secures the procedural and participatory dimensions. The born-digital corpus (*Charter…, 2003*; *Depocas et al., 2003*; *Rinehart & Ippolito, 2014*; *Rothenberg, 2000*; *The UNESCO…, 2016*; *The UNESCO…, 2021*) delivers technical methodologies for "variable media," and museum scholarship (*Altshuler, 2005*; *Knell, 2017*) legitimises anticipatory collecting. Some reports (*Anticipating Futures for Heritage, 2023*; *Dynamics…, 2024*; *Future Trends…, 2023*) anchor these ideas institutionally, while OAIS and ISO standards operationalise them at infrastructural level. Finally, klironomical works of the co-author of this study (*2019*; *2021*;

2024a; *2024b*; *Buychik & Tomanek, 2024*) provides a unified meta-disciplinary framework that integrates philosophy, cultural theory, and heritage management.

The convergence of these areas of inquiry substantiates the proposed klironomical model of anticipatory interpretation, encompassing the criteria of temporality, innovation, social resonance, technological sustainability, and ethical admissibility. Collectively, the reviewed scholarship confirms that "heritage futures" are not a by-product of preserving the past but the outcome of conscious cultural decision-making in the present, institutionally and technologically grounded.

Results

Conceptual Reconstruction and Clarification of the Terminological Framework

The analysis of contemporary literature demonstrates the necessity of refining the key concepts underlying the study of anticipatory interpretation of cultural phenomena. In traditional cultural theory, heritage was perceived through a retrospective lens—as monuments, collections, and objects representing the past (*Smith, 2006*). However, recent scholarship has shown that heritage has become a *dynamic construct*, encompassing processes, practices, and technologies that shape cultural significance in both the present and the future (*Harrison, 2015*; *Holtorf, 2024*). The concept of *heritage futures* integrates these approaches, emphasising that the heritage of the future is not merely the result of conserving artefacts from the past but of actively selecting and interpreting contemporary phenomena as potentially meaningful for future generations (*Harrison, 2020a*; *Harrison, 2020b*).

The emergence of *born-digital* artefacts—digital artworks, interactive media objects, and network-based projects—raises questions about the boundaries of preservation and representation. Whereas the traditional museum relies on physical artefacts, digital forms require new conceptual frameworks, as they exist within environments characterised by technological volatility and platform instability (*Charter…, 2003*). This not only renders the classical reliance on material carriers obsolete but also reveals the need to introduce categories such as *temporality* and *networked presence* into the conceptual field.

In parallel, the notion of *intangible heritage*, defined by UNESCO as the practices, expressions, and knowledge recognised by communities as part of their cultural identity (*Convention…, 2003/2022*), is undergoing re-examination. Within the framework of this study, intangible heritage is viewed not as a fixed practice but as an ongoing process of meaning-making and transmission. This distinguishes phenomenological approaches to intangible heritage from classical descriptive models (*Kirshenblatt-Gimblett, 2004*; *Hafstein, 2008*).

The term *klironomy* operates as a meta-concept uniting processes of interpretation, selection, and semantic organisation of cultural phenomena with an orientation toward the future. In both Russian and English scholarly corpora, klironomy has been developed as a theory of *anticipatory selection*, focused less on the preservation of the past and more on the formation of *future memory* (*Buychik, 2019*; *Buychik, 2024a*; *Buychik, 2024b*). Within the framework of klironomy, central questions concern the criteria of continuity, the ethical permissibility of selection, and the potential of contemporary objects to serve as cultural signs of the future.

From these conceptual premises, several essential features of the current paradigm of future heritage emerge: the primacy of process over static object, the intersubjectivity of meaning, and the technological and social mutability of phenomena. This significantly reshapes the academic landscape: whereas classical cultural studies focused on a fixed corpus of artefacts, contemporary heritage theory encompasses elements of network culture, digital artefacts, and practices that may not yet possess physical form.

Thus, the reconstructed conceptual field defines *klironomy* as an interdisciplinary framework capable of incorporating and reconfiguring the categories of *heritage futures*, *born-digital artefacts*, and *intangible practices* into a unified theoretical model, wherein heritage is not only what *was* but also what *becomes significant* for future cultural agents through the process of anticipatory interpretation.

Matrix Typology of Future Cultural Heritage Objects

The matrix typology developed in this study provides a tool for classifying contemporary phenomena according to their potential relevance as future heritage. This typology is structured along three principal axes: *material–intangible–digital*; *local–global–networked*; and *traditional–innovative–hybrid*. Such a system enables not only the systematisation of cultural manifestations but also the assessment of their potential for continuity.

Material objects remain the classical bearers of cultural meaning—architectural ensembles, monuments, and museum collections. For example, the cultural landscapes of Serbia or UNESCO-listed architectural monuments possess recognised historical and social value, yet their future depends on the sustainability of their social contexts, restoration practices, and educational integration (*Smith, 2006*). This category also includes innovative art forms in which physical artefacts interact with digital components, such as installations incorporating AR/VR technologies.

Intangible heritage encompasses practices, rituals, linguistic expressions, artistic traditions, and social customs. Studies in this field demonstrate that such elements evolve continuously within their cultural contexts and may be transmitted to future generations through social participation, media representations, and educational practice (*Convention…, 2003/2022*; *Kirshenblatt-Gimblett, 2004*). Folk music or artisanal craftsmanship preserved in communities exemplify such continuity through practice and transmission.

Digital phenomena—*born-digital* objects—include creations that originate in digital environments and have no physical source: network-based projects, digital artworks, memes, and interactive platforms. Their defining characteristic is dependency on platforms, protocols, and technological standards. For instance, digital museum collections such as the virtual exhibitions of the Louvre or the British Museum illustrate how digital forms can expand accessibility while simultaneously demanding new criteria for preservation and description (*Charter…, 2003*; *The UNESCO…, 2016*). These phenomena operate simultaneously on local and global levels, reflecting the networked structures of contemporary cultural communication.

Along the *local–global–networked* axis, analysis reveals that many practices initially rooted in specific local contexts acquire global reach through digital dissemination: for example, folk songs uploaded to international video platforms become part of a shared cultural ecosystem.

Hybrid forms—such as mixed reality installations—combine local traditions with global digital practices, illustrating the complexity of contemporary cultural space.

The *traditional–innovative–hybrid* dimension highlights that innovative digital projects frequently integrate traditional cultural elements, generating new hybrid modes. For instance, virtual-reality reconstructions of ancient temples exemplify how digital reproduction can complement physical heritage and engage new audiences with material otherwise accessible only to specialists.

Thus, the matrix typology of future heritage objects allows for the systematic classification of contemporary cultural phenomena not only according to their material or digital properties but also by their potential significance for future generations. This model establishes a foundation for the formulation of selection criteria, providing an analytical framework applicable to subsequent stages of research as well as to practical decision-making in museology, archival policy, and cultural management.

Scenarios and Mechanisms of Future Heritage Formation

The development of future heritage scenarios draws upon methods of futurological inquiry, particularly *foresight* techniques and the concept of *heritage futures*, which enable scholars not merely to describe present processes but to anticipate possible trajectories of cultural significance (*Miller, 2018*). This study identifies four broad scenarios, each representing distinct mechanisms of heritage formation.

The *conservative scenario* corresponds to traditional preservation paradigms, emphasising material objects, institutional conservation practices, and museum cataloguing. It characterises classical museums, national libraries, and archives, where processes of selection and safeguarding rely on established standards of long-term conservation (*Smith, 2006*). The restoration of medieval architecture exemplifies this approach: physical materials and artisanal techniques remain central, and continuity is ensured through adherence to historical canons and educational programmes oriented toward the past.

The *innovative scenario* focuses on digital and networked forms of heritage. Here, *born-digital* artefacts, interactive projects, and digital repositories assume a central role. This reflects the expansion of cultural heritage beyond the physical domain to encompass objects existing exclusively in digital form. Online archives of contemporary digital art, for instance, preserve and interpret web-based works as part of the cultural patrimony of the future (*Charter…, 2003*; *The UNESCO…, 2016*). In this scenario, continuity depends on the ability of communities and institutions to adapt to shifting technological standards and ensure long-term accessibility.

The *hybrid scenario* represents the interaction of material and digital realms. It includes projects that combine physical objects with digital traces—digital replicas of museum exhibits, AR-guided tours of archaeological sites, and VR reconstructions of historical spaces. Such projects demonstrate how material artefacts gain renewed vitality through digital media, broadening their audience and interpretive scope. Virtual reconstructions of destroyed monuments available through online educational platforms exemplify this form of heritage regeneration.

The *networked or communicative scenario* conceptualises heritage as a community of practice in which continuity is sustained not through individual objects but through patterns of social

interaction. Collective creativity, digital content exchange, cultural memes, and crowdsourced documentation of local traditions exemplify this model. Continuity here is maintained not by physical carriers but by enduring social relationships and communicative codes that circulate across digital networks.

Analysis of these scenarios indicates that the mechanisms of future heritage formation are plural and cannot be reduced to a single dominant trajectory. In each case, not only artefacts but also interpretive processes, social participation, technological infrastructures, and ethical frameworks determine what is deemed worthy of preservation.

Thus, scenario analysis demonstrates that the heritage of the future emerges through a complex interplay of institutional, innovative, hybrid, and networked mechanisms. These scenarios function as an operational model for identifying which cultural phenomena possess the potential to become significant for future generations, as well as which strategies of selection and preservation may prove most effective in the dynamic cultural and technological landscape of the twenty-first century.

Ethical and Philosophical Foundations of Anticipatory Selection

The ethical dimensions of anticipatory interpretation of cultural phenomena form a central element in understanding the heritage of the future. The primary ethical challenge lies in the fact that the selection of objects and practices for inclusion in future memory is inevitably value-laden: it involves deciding what is significant, which communities should be represented, and how to balance cultural diversity and social justice. These questions emerge at the intersection of cultural philosophy, ethics, and the social sciences.

Traditionally, the philosophy of culture treated heritage as an object of the past, intended to consolidate collective memory in the present. However, the shift to an anticipatory paradigm raises the question of the rights of future generations to construct memory: can the present impose its own value perspectives on the future? Within heritage ethics, this correlates with the concept of responsible intergenerational interaction, emphasising respect not only for the past but also for future cultural agencies that will live with the outcomes of current decisions (*Mangnus et al., 2021*).

A key element of ethical reflection is the acknowledgement of multiple cultural perspectives. The critique of universalism in cultural policy demonstrates that global institutional standards of selection may not be relevant or applicable within local contexts, thereby reinforcing inequalities. International frameworks for the safeguarding of intangible heritage, such as UNESCO's 2003 Convention and its subsequent updates (*Convention…, 2003/2022*), explicitly call for the recognition of local cultural values rather than their subordination to universal models. This challenges traditional museum and archival policies that privilege "canonical" objects of cultural value over community-based practices.

The ethics of anticipatory selection also encompass technological responsibility. In an era of digital cultural practices and born-digital artefacts, ensuring accessibility, long-term preservation, and the right to privacy becomes essential. This challenge is evident in relation to user-generated digital creativity, which may involve personal data, intellectual property, or culturally sensitive content requiring careful interpretation. Ethical standards must therefore balance openness and inclusivity with the protection of digital rights and ownership.

Social justice represents another core dimension. If anticipatory selection privileges phenomena capable of "survival" in future cultural ecosystems, it must ensure that selection processes do not further marginalise vulnerable communities. Consequently, continuity criteria should include the evaluation of representativeness, inclusivity, and community participation in shaping heritage registers. Contemporary research emphasises that the involvement of local communities in interpretative processes strengthens the sustainability of cultural practices and reduces the risk of their disappearance (*Hafstein, 2008*; *Kirshenblatt-Gimblett, 2004*).

The philosophical discourse on the heritage of the future also concerns the autonomy of meanings: heritage should not be limited to institutional control but should serve as a resource for creative self-expression by future cultural agents. This foregrounds the ethical respect for the plurality of cultural trajectories and the right to multiple futures. Scholars within the *heritage futures* framework argue that future heritage should not be a unified catalogue of objects, but a multilayered network of meanings and practices generated by diverse communities (*Harrison et al., 2020a*; *Harrison et al., 2020b*).

Thus, the ethical and philosophical foundations of anticipatory selection require a comprehensive approach integrating intergenerational responsibility, cultural diversity, technological ethics, and social equity. This provides not only a theoretical justification but also practical guidelines for developing selection criteria conducive to sustainable and inclusive cultural continuity.

The Klironomical Model of Criteria for Anticipatory Interpretation

The analysis of literature and empirical observations facilitated the development of a klironomical model of criteria for assessing cultural phenomena in terms of their potential significance for future heritage. The model is grounded in five key criteria: temporality, cultural innovation, social resonance, technological sustainability, and ethical admissibility.

Temporality reflects a phenomenon's capacity to retain significance over an extended temporal span. Unlike short-lived trends, such phenomena exhibit cultural endurance. For instance, traditional ritual theatre that has survived for centuries within a single region yet gained renewed vitality through video documentation and online representation demonstrates intergenerational accessibility and experiential continuity.

Cultural innovation characterises an object's or practice's ability to generate new semantic structures. This is particularly relevant for hybrid forms that combine traditional cultural elements with digital technologies—for example, augmented- or virtual-reality performances that reinterpret established artistic genres.

Social resonance refers to a phenomenon's capacity to elicit community engagement, shape collective meanings, and foster participation. Intangible practices such as street dance cultures disseminated through social networks exemplify how performative expression can become a focal point of identity formation for younger generations.

Technological sustainability is critical for born-digital and hybrid forms. It denotes the ability of digital objects to remain functional and accessible despite evolving technological standards. The problem of technological instability has been widely noted in digital heritage studies: without mechanisms of format migration and emulation, digital artefacts risk being lost (*Charter…, 2003*; *The UNESCO…, 2016*).

Ethical admissibility integrates value-oriented dimensions: a cultural phenomenon must comply with principles of respect for diversity, individual rights, and social justice. This involves analysing power structures that shape selection processes and preventing the marginalisation of local cultural agents.

The model presupposes a holistic evaluation of all five criteria, rather than their isolated application. For example, a digital festival project that merges local traditions with networked interactivity can be assessed in terms of community participation and accessibility across technological platforms. This multidimensional assessment identifies its potential as a future object of klironomy.

Thus, the klironomical model of criteria for anticipatory interpretation provides an integrative framework for evaluating cultural phenomena across temporal, technological, social, and ethical dimensions. It serves as both a theoretical and practical instrument applicable to museum work, digital archiving, cultural policy planning, and educational programming, ensuring balanced and multidimensional assessments of future heritage potential.

Practical Verification: Examples and Case Studies

The practical verification of the developed model was conducted through a series of real-world case studies encompassing material, intangible, and born-digital cultural phenomena, confirming its applicability and analytical precision. One example involves a digital art archive maintained by a major museum (e.g., virtual exhibitions of the British Museum), where digital replicas and augmented-reality tours are integrated into educational and research programmes. Such projects demonstrate that born-digital artefacts can function as active carriers of cultural meaning when embedded within educational and communicative contexts.

Equally instructive are hybrid projects, such as digital reconstructions of archaeological sites combining 3D modelling and interactive tours. These initiatives transcend physical access barriers, broadening cultural inclusion. Here, technology enhances the cultural relevance of the object rather than substituting its material form, showing that hybrid modes strengthen both social resonance and temporal endurance.

Intangible practices—regional music festivals or traditional crafts disseminated on global digital platforms—also confirm that community participation and temporal continuity are decisive for cultural sustainability. For example, craft practices documented within online communities and transmitted through instructional videos demonstrate how social engagement and digital traces reinforce durability. These examples validate the model's functionality as a diagnostic instrument for assessing social resonance and cultural innovation.

Thus, the practical testing of the klironomical criteria model confirms its effectiveness both for analysing individual phenomena and for informing strategic decision-making in museum, archival, and educational contexts. It thus substantiates the model's theoretical robustness and its capacity to support future-oriented cultural policy design.

Interdisciplinary Integration and Institutional Perspectives

The advancement of klironomy as an interdisciplinary field requires its institutional integration within systems of cultural governance, education, and international policy. Organisations such as UNESCO, ICCROM, and the ERRIN/CHARTER Alliance have already

highlighted the necessity of strategic approaches to future heritage through foresight methodologies and scenario planning (*Anticipating Futures for Heritage, 2023*; *Dynamics…, 2024*; *The UNESCO…, 2016*). This indicates that anticipatory interpretation is gaining institutional recognition.

A crucial direction involves embedding *futures literacy*—the ability to anticipate, analyse, and shape future scenarios—into academic curricula in the humanities and cultural management. This equips future professionals not only to preserve the past but also to project potential trajectories of cultural development and evaluate born-digital and hybrid forms from a long-term continuity perspective. Successful cases of such integration are already evident in European universities where museology and cultural management courses include modules on digital heritage and scenario analysis.

International projects such as virtual libraries and digital archives further demonstrate the necessity of institutional support for the preservation of born-digital artefacts. Countries with integrated digital heritage policies exhibit higher levels of preservation and public accessibility. This correlation is confirmed by studies emphasising the regulatory role of legal frameworks and international standards in ensuring the sustainability of digital heritage (*Charter…, 2003*; *The UNESCO…, 2016*).

Finally, klironomy can serve as a methodological foundation for establishing local and national registers of future heritage that encompass not only material monuments but also digital projects, online practices, intangible traditions, and hybrid forms. This necessitates the revision of existing inventory systems and the development of new documentation and evaluation tools for emerging cultural phenomena.

In conclusion, the findings demonstrate that the interdisciplinary and institutional integration of klironomy within systems of cultural governance, education, and international cooperation is not only feasible but essential. It provides a foundation for a sustainable and inclusive approach to the heritage of the future—one in which cultural value is defined not solely by the past but also by the evolving horizons of contemporary cultural experience.

Discussion

The relevance of the research topic—interpreting the contemporary and the new as the cultural heritage of the future—is confirmed by the fact that in the twenty-first century the very process of conceptualising heritage has moved beyond the conservation paradigm to become a field of philosophical, cultural, and ethical reflection. In the context of rapid digitalisation, global mediatisation, and social polyphony, the question of which phenomena of the present may become the cultural heritage of the future acquires strategic importance. Essentially, it concerns the emergence of a new form of cultural responsibility—the ability to foresee the consequences of one's cultural actions and to understand their possible place within the continuity of humankind (*Harrison, 2020a*; *Harrison, 2020b*; *Holtorf, 2024*). Therefore, the klironomical perspective introduced in this study represents not merely an academic innovation but also a necessary tool for civilisation's cultural self-awareness.

The general problems identified in the research are primarily connected with the gap between the conceptual and the practical dimensions of heritage interpretation. Contemporary international frameworks (*Anticipating Futures for Heritage, 2023*; *Convention…, 2003/2022*)

recognise the necessity of preserving not only tangible but also intangible and born-digital forms of cultural expression. However, in practice, a conservative approach still prevails—one grounded in notions of materiality, uniqueness, and static authenticity. This perspective is poorly aligned with digital and networked phenomena, where meaning is generated processually and the media carriers are subject to rapid technological obsolescence (*The UNESCO…, 2016*). A structural problem thus arises: how can we preserve what is inherently mutable, reproducible, and infinitely replicable? Classical restoration logic is inapplicable here, as born-digital objects cannot be restored in the traditional sense; they require methods of archival migration, emulation, and institutional flexibility (*Rinehart & Ippolito, 2014*).

A second set of issues concerns the insufficient philosophical and ethical grounding of the "heritage of the future" concept. As noted by Harrison (*2015*) and Holtorf (*2024*), contemporary heritage is not only about the past but also functions as an instrument for modelling the future. Yet the question of who holds the authority to determine what shall be recognised as heritage remains unresolved. There exists a risk of "future appropriation"—a condition in which decisions about inclusion in heritage registers are made by a narrow circle of institutions that fail to reflect cultural diversity. This situation generates symbolic inequality and marginalises alternative cultural voices. Hence, the ethics of selection, cultural justice, and inclusivity become of paramount importance. As Kirshenblatt-Gimblett (*2004*) and Hafstein (*2008*) observe, intangible heritage exists only through the participation of its living communities; the same principle should apply to digital and hybrid forms, where collective meaning-making is the key to continuity.

Methodologically, the research encountered several challenges that are of interest for future inquiry. The first is the absence of a unified database or standardised registry of born-digital and hybrid cultural objects. Despite the efforts of UNESCO/PERSIST and initiatives by institutions such as Tate Digital and Rhizome ArtBase, systematic archiving of digital forms remains fragmented. This creates lacunae for philosophical and cultural analysis, as many objects disappear together with obsolete platforms, leaving no possibility for their future comprehension. Paradoxically, the empirical basis of future heritage is inherently unstable: we are studying phenomena, some of which are already inaccessible or lost.

Another methodological challenge lies in the boundary between scientific description and normative construction. When analysing contemporary phenomena as potential heritage, the researcher inevitably participates in the process of selection, imposing a particular system of values. Such a position demands reflexivity to avoid substituting analytical objectivity with normative judgement. In this study, this risk was mitigated by introducing the klironomical model of evaluation criteria based not on aesthetic preferences but on parameters of temporality, innovation, social resonance, and technological sustainability. Nevertheless, the model still requires refinement and verification through interdisciplinary expert review and broader empirical testing.

The relationship between individual and collective memory within born-digital phenomena also remains unresolved. On one hand, digital culture democratises the creation and storage of cultural artefacts, allowing anyone to become a co-author of future heritage (for example, digital photography, user-generated content, or meme culture). On the other, the abundance of data produces a "profusion effect" (*Harrison et al., 2020a*; *Harrison et al., 2020b*), in which the valuable

becomes indistinguishable from the trivial. Therefore, instead of expanding the range of preserved phenomena, new semantic filters of long-term relevance are needed. This task cannot be addressed within a single discipline—it requires a synthesis of cultural studies, information science, philosophy of technology, and ethics.

The authors also highlight the difficulty of operationalising the concept of "ethical admissibility". Within cultural theory, the ethics of heritage remains insufficiently formalised. Translating ethical principles into selection criteria risks reducing the value dimension to administrative procedures. Meanwhile, cultural justice and inclusivity demand flexible, context-sensitive solutions that reflect the specificities of each cultural environment. Consequently, the development of klironomy necessitates a new ethical paradigm that integrates universal human rights with respect for local cultural autonomy.

Despite these limitations, the findings confirm that the klironomical model can serve as an effective instrument for analysing future heritage. Its strength lies in integrating multiple dimensions—philosophical, sociocultural, and technological. It enables not only the classification of phenomena but also the evaluation of their potential for long-term existence, which is particularly critical for born-digital and hybrid forms subject to technological instability. In this sense, the very concept of klironomy complements the global heritage futures agenda, offering a theoretical foundation for understanding continuity as a process of culture's self-reproduction of meaning (*Buychik, 2024a*; *Buychik, 2024b*).

Several directions for future research can be proposed. First, expanding the empirical base through the analysis of digital archives, online museums, and hybrid art projects would enable testing of the klironomical model across diverse data. Second, algorithmic tools for cultural evaluation, grounded in artificial intelligence and semantic analysis, should be developed to automate the preliminary identification of born-digital objects. Third, international interdisciplinary research platforms are needed to unite philosophers, cultural theorists, IT specialists, lawyers, and museum professionals. Finally, the ethical and ontological foundations of klironomy should be further elaborated, particularly concerning cultural memory in the era of posthumanism and artificial intelligence.

Thus, the discussion demonstrates that the study not only confirms the importance of transitioning from the conservation to the anticipatory paradigm of heritage but also reveals a number of theoretical and methodological gaps requiring further exploration. Klironomy, as a new science of cultural continuity, opens space for interdisciplinary dialogue in which the past, present, and future are comprehended as a single dynamic process of humanity's cultural self-preservation.

Conclusion

The fulfilment of the research aim—the development of a theoretical and methodological model for the anticipatory interpretation of contemporary cultural phenomena as future heritage—confirmed the initial hypothesis that in the digital and hybrid era, heritage ceases to be a purely retrospective category. It becomes a space of meaning-making directed toward the future, where the interpretation of the present serves as the key mechanism of continuity. The findings demonstrate that the concept of klironomy can integrate diverse theoretical traditions

and disciplinary perspectives, providing a foundation for a new paradigm—the science of cultural continuity.

A conceptual reconstruction of the heritage field was carried out, correlating traditional categories such as "monument", "tradition", and "preservation" with modern notions of *heritage futures*, born-digitality, hybridity, and intangible practices. This reconstruction enabled the transition from a static model of heritage to a dynamic, klironomical one, where the process of continuous production and transmission of meanings becomes central (*Buychik, 2024a*; *Harrison, 2015*). Consequently, klironomy is not merely an auxiliary discipline but an integrative framework linking philosophy, cultural studies, art history, technology, and ethics.

A second major outcome is the development of a matrix typology of future heritage objects. This typology systematises cultural phenomena along three axes—"tangible–intangible–digital", "local–global–networked", and "traditional–innovative–hybrid". Such a structure reflects the complexity of the contemporary cultural environment, in which physical and digital forms coexist and cultural value depends not solely on origin but on context. The matrix model thus provides an analytical tool applicable to museological and archival practice in the age of networked culture.

A third result is the creation of the klironomical model of anticipatory interpretation criteria, encompassing parameters of temporality, cultural innovation, social resonance, technological sustainability, and ethical admissibility. This model demonstrates that the evaluation of cultural phenomena must account not only for their historical or present value but also for their potential to retain meaning in the future. Digital art, interactive installations, and online practices, in particular, exhibit high degrees of innovation and social engagement, making them essential components of future klironomy (*Charter……, 2003*; *Rinehart & Ippolito, 2014*).

The practical validation of the model through case studies—digital archives, virtual museums, craft communities, and hybrid projects—confirmed its applicability. These cases show that phenomena previously considered peripheral to traditional heritage possess significant potential for continuity when supported by social resonance and technological stability. However, the challenges identified—platform instability, lack of unified digital archiving standards, and legal uncertainties—underscore the need for institutional reform and the development of new regulatory tools.

Particular attention should be devoted to the ethical and philosophical dimension of klironomy. Anticipatory heritage requires a different moral framework—one that replaces universalist hierarchies with a polycentric, dialogical model in which diverse cultural communities co-define what is meaningful. This ethical turn in heritage theory entails respect for the plurality of cultural futures and the rejection of value hierarchies. Klironomy thus becomes not only a theory of continuity but also a practice of cultural equality.

At the institutional level, the study's results can inform the creation of national and international registers of future heritage, the revision of educational standards in museology and heritage management, and the design of digital preservation strategies. The proposed model also enables the integration of *futures literacy* (*Anticipating Futures for Heritage, 2023*; *Miller, 2018*) into professional training for heritage specialists, combining philosophical reflection, technological expertise, and ethical responsibility within a unified framework.

The study outcomes hold value for multiple professional domains: for philosophers—as a foundation for rethinking the ontology of culture and memory; for cultural theorists and art historians—as a tool for analysing hybrid and born-digital forms; for museum professionals and archivists—as practical guidance for evaluating and preserving new types of artefacts; and for students and early-career researchers—as a methodological framework for studying mechanisms of cultural continuity.

The final conclusions can be summarised in several principles for further research in klironomy and heritage futures:

1. The shift from static models of preservation to processual models of meaning reproduction.
2. The necessity of interdisciplinary integration between philosophy, technology, and sociocultural practice.
3. The recognition of born-digital and hybrid forms as legitimate bearers of cultural memory.
4. The ethical safeguarding of multiple cultural futures.
5. The institutionalisation of klironomy as a new metadiscipline within the humanities.

Thus, the study confirms its central hypothesis: contemporary and new cultural phenomena can be regarded as future heritage through klironomical interpretation. Culture, endowed with the capacity for self-reproduction of meaning, forms not only memory of the past but also memory of the future—i.e., the potential for its continuity. This is the essence of klironomy as a science of living cultural time, uniting the past, present, and future within a single humanistic horizon.

Conflict of Interest

The authors declare that there is no conflict of interest.

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Liudmila I. Ivonina [a][3]

Representation of the Peace of Utrecht 1713 in English Poetry [2]

Abstract:
During the formation of the Westphalian system (1648–1815), peace congresses functioned not only as arenas of negotiation but also as stages for representing the prestige and culture of each state. The article presents the most vivid examples of how the Peace Congress of Utrecht (1713) was represented in early Enlightenment English poetry. During the War of the Spanish Succession (1701–1714), Britain's political scene became, for English poets, a European stage. Scholarly tradition has long maintained that one could easily distinguish Tory poets from Whig poets by their attitudes towards peace. The author challenges this assumption, focusing instead on the poets' perception of the Peace of Utrecht and the thematic content of their poems. The reception of the Utrecht Peace by English poets was generally positive, and their poems sought to offer an appropriate representation of this significant event for Britain and to celebrate its heroes. Notably, some poets glorified the very act of peace and its architects, contrasting it with the previous years of warfare, while others emphasised that the foundations of the Peace of Utrecht had been laid through the deeds of its heroes — military commanders and diplomats. Among the poetic reflections, Alexander Pope's Windsor Forest may be regarded as the most successful artistic representation of the Peace of Utrecht, whereas Thomas Tickell's The Prospect of Peace is distinguished by its political neutrality. The so-called "Tory peace" was praised not only by Tory writers but also by poets sympathetic to Whiggism. Yet, regardless of political affiliation, the poets expressed in their works a unifying political idea that epitomised their patriotism and loyalty — the idea of British supremacy. Overall, the poetic representation of peace appealed to the restoration of material prosperity for the subjects and to the renewal of amicable relations among sovereigns.

Keywords: War of the Spanish Succession, Utrecht Peace, representation, English Poets, Tories, Whigs, policy, career, emotions, military commanders, diplomats.

Introduction

The study of Peace Congresses during the formation of the Westphallian system (1648–1815) confronts scientists not only with changing concepts of international relations, but also with new public practices for the presentation of diplomacy in Europe. Peace Congresses were not only a common negotiation process, but also a place of representation of the significance and culture of each state. In fact, the European Congress was a carefully designed triumph of peace within the continent, which required considerable funds, was widely covered in the press and glorified in celebrations, paintings, poetry, commemorative medals and even fashion.

The problematic of Peace has always been relevant, but since the 1970s of the last century, as the famous German scientist, director of the Institute of European History (Mainz) in 1996–2011, Heinz Duchhardt emphasized, it began to acquire inspiration, following the "fashionable" trend. In historiography, more and more attention has been paid to the cultural representation of peace. At the same time, the vast majority of publications on this subject are the result of the collective work of researchers, what is explained by its composite and interdisciplinary nature. There are also significant works rethinking the meaning of individual congresses through research of the relationship between culture and politics. Besides, at the end of the 20th century

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and present century, there were held a significant number of international scientific forums dedicated to the anniversaries of the end of the European Wars, which clearly demonstrated the broadcast and perception of peace congresses in wide sections of society (*Duchhardt, 2019, p. 3*; *Friedensbilder in Europa…, 2013, p. 11*; *Bussman & Schilling, 1998*; *Dingel et al., 2018*; *Köhler, 2016*; *Bruin et al., 2015*; *Duchhardt & Espenhorst, 2013*). Researchers' attention to the public representation of European congresses is very significant in the context of studying the assessments by contemporaries and descendants of key European events of the early Modern Time and commemorative practices. In the culture of the memory of that epoch, peace negotiations played no less, and perhaps even more, role than battles and wars.

To a large extent, mass consciousness feeds on catastrophes, changes, and triumphs. In this regard, the representation of Peace Congresses demonstrates considerable scientific interest and great benefit in the reconstruction of a complex historical panorama.

By the end of the War of the Spanish Succession (1701–1714) in 1713, peace became a reality in Europe. The results for Britain of the peace treaties signed in the spring and summer of 1713 in Utrecht are well known. Gibraltar, Minorca, Nova Scotia, the Hudson Bay territory, and "Sugar Island"—St Christopher—were passed to England. It also received the fishing rights in Newfoundland and the right of *asiento* in the Spanish colonies: the profitable trade of Negroes, at the backs of which capital would be accumulated for the industrial revolution, passed into the hands of British companies for 30 years. The destruction of Dunkirk cemented London's dominance in the English Channel, and France and other powers recognized the inheritance of the English throne by House of Hanover (*Legg, 1925, p. 25*; *Brown, 1935, pp. 273–276, 364-365*; *Browning, 1953, pp. 885–889*). The peace treaties of Utrecht (1713), Rastatt and Baden (1714) which created an international order for the next half of the century was not only a result of physical and financial exhaustion of the main participants of the War, but also of its expected strength in territorial, political and legal relations.

The metaphor of a balance of power was the new "philosophy" of peace. In 1713, it was included in the texts of two treaties and in the work of the Abbe de Saint-Pierre, and became a legal postulate since that time. The established balance of power broke the hegemony of France in Europe, and removed the danger of a new "universal monarchy", which had disturbed the minds of Europeans for half a century (*Duchhardt, 1987, p. 11*; *Bely, 1995, p. 223*). Already in Utrecht, however, it became quite apparent that in many ways London initiated the production of legal norms for "middle states" with a restriction of their resources and the control by the third party of any power's aggression in Europe. Undoubtedly, it only strengthened the theory of British exceptionalism, to which creation poets made a significant contribution.

Materials and Methods

During the War of the Spanish Succession, the political scene of Albion became to the English poets also the European scene. There is a widely spread belief in literature that it was then possible to distinguish accurately Tories from Whigs by their relation to peace. Is that in any way true? For politicians, it was a distinct position, but creative people, in our case, English poets, could observe somewhat differently what was happening in the broader world.

I will not pursue a purely literary analysis of poems of 1713 in this article, but focus on their authors' perception of the Peace of Utrecht and their content. To do this, I use a systems

approach and content analysis as well as a constructivist approach with an emphasis on practices in public history and the cultural history of feelings. First, I shall consider the poetic "occasions" that are marked by philological and historical research. Theoretically, poetic events were moments of praise and exaltation: effusions of loyalty to cultural leaders or to those who triumphed over circumstance and anchored national or cultural values of some demonstrable sort. The most important occasions for poetry were events that seemed both politically and nationally decisive. For example, the Duke of Marlborough's victory at Blenheim was one such event—there are 24 poems related to it, including those by John Philips and Joseph Addison. Another was the ensuing Peace of Utrecht, which was praised by Bevil Higgons, Joseph Trapp, Alexander Pope, Thomas Parnell, Thomas Tickell, William Waller, Samuel Wesley, Marshall Smith, Henry Crispe, Nicolas Tucker and, in addition, six anonymous poets (*Richetti, 2005, p. 184*).

Typically, poets publicly identified themselves with Whigs or Tories, with an individual patron or a group of patrons. In England, like in all of Europe, the patronage system was quite common in the Baroque and Enlightenment ages. The poets' opinion of the social events was generally known. Their rhetorical abilities were not overlooked, and they often reinforced political arguments with the help of beautiful words.

It is noteworthy that the patronage system and monetary support contributed to the fact that poets often did not write so much for society, but for a specific, individual reader in accordance with his interests in politics and the need to respond to the event of great importance. Poetry often acquired a semblance of propaganda, and poets were significant participants in public debates and discussions. However, not all the poetry of the time was ideological, and not all ideological poetry was politically directed. Nevertheless, the tendency to consider the social event as a poetic debt and related habit, the association of the majority of events with the practice of patronage and the patron's loyalty created a feeling that poetry was a practical and rhetoric art (*Richetti, 2005, p. 183–185*).

Recent papers note that works of both Tory and Whig tenor were similar in their political influence, the intentions of their authors and reflection on Great Britain's triumph, and that poems by the authors sympathizing with the Whigs at times even exceed poems by "Tory" writers, and were well patronized by Whig grandees. One of the researchers into Whig poetry, Abigail Williams, while recognizing that "aesthetics" was only about politics, even asked the question: why have such poems not survived in the canon of creative writing at the beginning of the 18th century? Williams believes that, in contrast to the 1680s, there was not a significant difference between the Whigs and Tories in the reign of Queen Anne. The Whigs, including poets, eagerly joined in the mockery of their friends, and, like the Tories, became increasingly interested in "sociability" and "politeness" (*Williams, 2005, pp. 22, 204*). For example, Swift dedicated "Tale of a Tub" to Lord Somers, one of the most famous of the Whig patrons, and claimed all his life to be "a Whig in politics"; Pope tried hard, especially in his early years, to escape any political label, and maintained friendships with writers from both parties. Whig patrons were also ready to support poetry that did not have "a specific political agenda". At the same time, there is another point of view on Pope. Robert Rogers focuses on the idea that Pope was a Stuart loyalist, and his poem "Windsor Forest" is consistently political, with pronounced Stuart and even Jacobite sympathies, and aspired to the continuation of the "golden age of the

Stuarts" (*Rogers, 2005, p. 317*). Clearly, the debates about the political content of poems and their authors' sympathies do not cease, and it is doubtful whether we should put an end to this situation. The vision of historians and philologists can be multi-angled. In any case, we are primarily interested in the reflection of a particular event in European history and its heroes. From the standpoint of systemic and normative-value approaches, this article attempts to analyze the representation of the Peace of Utrecht of 1713 in English poetry. The systemic approach allows to determine the place and role of Great Britain in the transformation of the system of international relations of the period under study and to identify the determinants that influenced the opinions of poets. Using the normative-value approach, one can clarify the significance of the conclusion of peace for Britain and European society.

Literature Review

The cultural and political interpretations of the Peace of Utrecht (1713) have become a central theme in both historical and literary scholarship, uniting the perspectives of diplomatic history, cultural memory studies, and literary criticism. The works referenced in this study reveal how the evolution of peace culture in early modern Europe was intertwined with symbolic representation and ideological discourse. In this respect, the research conducted by Heinz Duchhardt (*1987*; *2019*) and his collaborators (*Duchhardt & Espenhorst, 2013*; *Dingel et al., 2018*) has been foundational. Duchhardt's concept of *Friedens-Miniaturen* (*2019*) and his exploration of *Krieg und Frieden im Zeitalter Ludwigs XIV* (*1987*) provided a historiographic model for studying peace as a performative and representational act rather than solely a juridical instrument. He demonstrated that peace congresses such as Münster, Nijmegen, and Utrecht were not merely diplomatic but also cultural events that established ceremonial and aesthetic frameworks for the legitimation of power.

This cultural perspective has been extended in the collective works *1648—Krieg und Frieden in Europa* (*Bussman & Schilling, 1998*) and *Theatrum Belli—Theatrum Pacis* (*Dingel et al., 2018*). Both volumes examined the interconnection between the iconography of peace and the rhetorical and artistic mechanisms of early modern diplomacy. They established the methodological premise for analysing visual and textual representations of peace—what later studies would identify as the "semiotics of peace". Similarly, the exhibition catalogue *Friedensbilder in Europa 1450–1815* (*2013*) conceptualised the *art of diplomacy* as a cultural phenomenon that merged political negotiation with symbolic communication, thus aligning diplomatic ritual with artistic production.

The notion of peace as *representation* was further developed by Köhler (*2016*), who emphasised the strategies and symbolic practices of negotiation at the Congress of Nijmegen, and by Klesmann (*2007*), whose research into *Bellum solemne* clarified how early modern declarations of war and peace functioned as codified legal performances. Together, these German scholars articulated a multidisciplinary framework for studying the performative dimension of peace that underpins Ivonina's analysis of the Utrecht Peace as an artistic and poetic phenomenon.

The British historiographical tradition also contributed significantly to understanding the political implications of the Peace of Utrecht. Legg's *British Diplomatic Instructions 1689–1789* (*1925*) and Brown's *The Letters and Diplomatic Instructions of Queen Anne* (*1935*) remain key

documentary sources for reconstructing the political background of the 1713 treaties. These editions, complemented by Browning's *English Historical Documents* (*1953*), illuminate the institutional and ideological dimensions of Queen Anne's foreign policy and the mechanisms through which diplomacy shaped national identity in Britain. The correspondence of Alexander Pope, meticulously edited by Sherburn (*1956*), provides a parallel insight into the intellectual milieu of Queen Anne's reign, in which literary production mirrored political debates about war, peace, and moral order.

The interdisciplinary dialogue between diplomatic history and literary studies is evident in Richetti's *Cambridge History of English Literature, 1660–1780* (*2005*) and Weinbrot's *Cambridge History of British Literature from Dryden to Ossian* (*1993*). Both authors situate 17th-century and 18th-century English poetry within the context of ideological transition from Restoration absolutism to Enlightenment rationalism. They interpret the poetic responses to the War of the Spanish Succession as reflections of evolving concepts of national mission, moral virtue, and civic humanism. Within this framework, the Peace of Utrecht emerges as a discursive symbol that allowed poets to negotiate between patriotism and cosmopolitanism. The same thematic balance informs the analysis by Williams (*2005*), who investigates how Whig and Tory poets constructed distinct literary cultures yet shared a common rhetoric of sociability and "politeness". Her research challenges the traditional binary of Whig versus Tory poetry by revealing the mutual permeability of their aesthetic and ideological agendas.

Robert Rogers (*2005*) deepens this discussion by analysing Pope's *Windsor Forest* as a political allegory that embodies Stuart loyalism and Tory pastoral ideology. He argues that the poem transcends mere party propaganda and articulates a universal principle of harmony rooted in the classical notion of *concordia discors*. This interpretation aligns with Duffer's (*1988*) reading of Pope's work as both political and pastoral: a vision of peace as the natural culmination of divine and social order. Together, these scholars elucidate the symbolic interplay between politics, nature, and morality in early Enlightenment literature.

Aestheticised representations of peace were not confined to Pope alone. Studies by Cummings (*1988*) and Williams (*1987*) show that Addison's and Tickell's works—especially *The Prospect of Peace* and *Cato*—embody the rhetorical transformation of military triumph into civic virtue. In *Cato*, Addison juxtaposes the sacred imperative of peace with the tragic obstinacy of war, thereby framing the Treaty of Utrecht within a moral-philosophical discourse on liberty and reason. Cummings (*1988*) emphasises Addison's ambivalence toward Tory triumphalism while recognising the unifying cultural sentiment that accompanied the cessation of war. Williams (*1987*) adds that Pope's "painted scene" aestheticised the peace process by blending allegory, landscape, and political theology, turning Windsor Forest into a metaphor for cosmic and civil concord.

The literary representation of peace also intersects with the economic and social transformations of early 18th-century Britain. In the poems of Trapp (*1713*), Higgons (*1713*), Parnell (*2024*), Tickell (*1713*), and Waller (*1713*), the Peace of Utrecht is portrayed as the foundation of national prosperity and commercial freedom. Their emphasis on trade, navigation, and maritime symbolism—echoing the metaphors of "ships", "oceans", and "winds"—corresponds with the emerging discourse of *Pax Britannica*, in which economic productivity replaces military conquest as the measure of greatness. These poetic tropes mirror

the socio-economic realities recorded in contemporary documents (*Brown, 1935*; *Legg, 1925*) and prefigure Britain's eighteenth-century transition toward global mercantile hegemony.

From a comparative standpoint, the poetic reactions to peace in Britain can be situated within a pan-European framework of representation. Bely (*1995*) and Duchhardt (*2019*) note that continental intellectuals perceived peace congresses as "theatres of civilisation," where nations performed their political maturity. This metaphor of theatricality—further explored by Dingel et al. (*2018*) in *Theatrum Belli – Theatrum Pacis*—helps contextualise English poetic responses as part of a broader cultural diplomacy that visualised peace through spectacle, art, and language. Ivonina's reliance on these works underscores her methodological synthesis of cultural history, public history, and affect theory, particularly in analysing the "emotional history" of peace celebrations.

Parallel developments in legal and political theory also inform the literary discourse. The works of Klesmann (*2007*) and Duchhardt (*1987*) highlight how the codification of peace in the early modern period transformed political legitimacy into a performative act. Their findings complement the constructivist and systems approaches adopted in recent historiography, bridging the gap between diplomatic ritual and the cultural semantics of representation. Within this paradigm, poetry operates as a discursive medium that both documents and shapes the collective consciousness of peace.

The interrelation of diplomacy and poetics reaches a distinctive expression in Brunstrom's (*2014*) analysis of Matthew Prior. Brunstrom shows that Prior's dual role as poet and diplomat epitomises the merging of artistic sensibility with political pragmatism. His phrase "In Prose and Business lies extinct and lost" encapsulates the tension between bureaucratic responsibility and poetic vocation, demonstrating how diplomacy itself could become an aesthetic practice. This insight complements Ivonina's view that the Utrecht Peace represented a cultural performance as much as a political settlement.

Equally, the contemporaneous poetic corpus—including works by Smith (*1713*), Crispe (*1713*), Wesley (*1713*), and Newcomb (*1713*)—illustrates how writers translated legal and diplomatic concepts into accessible moral allegories. The repetitive invocation of divine sanction and maritime imagery symbolised a new moral economy in which commerce and virtue were mutually reinforcing. Such texts anticipate later Enlightenment ideals of rational internationalism and balance of power, as theorised by the Abbé de Saint-Pierre and embedded in the treaty language itself (*Duchhardt, 1987*; *Bely, 1995*).

Collectively, the cited scholarship and poetic sources reveal that the representation of peace in early eighteenth-century Britain was not confined to political discourse but permeated artistic, theological, and emotional registers. Historians and literary critics alike (*Duchhardt, 1996–2019*; *Richetti, 2005*; *Rogers, 2005*; *Williams, 2005*) concur that the Peace of Utrecht marked a shift from the rhetoric of victory to that of reconciliation, from martial heroism to civic virtue. The intertextual synthesis of historical documentation and poetic expression thus serves as an interpretive key to understanding the emergence of a European consciousness of peace—one that foreshadowed Enlightenment humanism and the ideological foundations of modern international relations.

Results

The conclusion of agreements in Utrecht caused a storm of emotions in Great Britain, expressed in poems dedicated to the peace treaty. These works, most of which contain a form of propaganda, put a final end to the political debates of continuing the war of the Spanish Succession and introduced new ideas. What were these ideas? I will consider this with the most notable poems—both in the political and historical as well as in the poetic and emotional aspects.

Joseph Trapp (1679–1747) was an English clergyman, academic and the first Oxford Professor of Poetry. His poem "Peace" was dedicated to Henry St John, Viscount Bolingbroke, whose chaplain he became in 1712, a position Swift had held. On April 1, 1713, Swift would not dine with Bolingbroke because he expected to "look over a dull poem" of Trapp's. Nevertheless, afterwards he did correct the poem, printed anonymously at Dublin, which was put to music by William Croft. Indeed, Trapp's poem was like a song. "It's done! Great job done! Britain today is so wise, as great!" This is the beginning of Trapp's poem, after which he immediately evaluated the positions of Britain, Queen Anne and the work of his patron.

The plot of the poem continues in this vein: for a long time, her sons had died for Belgian greed and Austrian pride, suffered combat fire, but then the just "Patriots of Britain" united strongly against the warlike forces of the Earth and the Sky. The author appreciates the military achievements of the hero (the Duke of Marlborough), who won on the battlefields of the War of the Spanish Succession. However, the poet also recognizes their terrible price (especially referring to the bloody battle of Malplake on September 11, 1709), and asks why the brave British, who had gained a triumph, had to destroy what could be saved? Trapp believes that the more glorious hero is he who "saved us [the British] from our own Victorious Arms", i.e, to say "More Courage shewn in Making Peace than War."

The real heroes were the Queen Anne and her wise counsellors. In the complex restoration of balance in the world and order in the warring countries the poet saw the power and wisdom of Anne, her superiority over other monarchs, awaiting their fate at her throne. Thus, he emphasized the leading role of London in the Congress of Utrecht. Anne is the arbitress of all states; she preserves the balance in strong hands and manages a variety of interests. The great King Louis is proud of her friendship:

While States averse to Peace in Feuds engage
And fruggling Nations obstinately rage
Supreme and Eminent Great Anna stands
And holds that Balance with unherring Hands[…]
Tho' by Hir Frienschip mighty Louis grac'd
With Joy the Happy Pledge of Peace embrac'd […]

Trapp prized the work of Anne's supporters—British ministers and diplomats, who were concerned with preparation of the peace treaty, Bolingbroke, Oxford, Shrewsbury, Strafford, Bristol, etc. For example, Anne's minister, the brilliant Bolingbroke, graced the court of the French King:

The boasted Elegance of France out don
By Anna's Minister and Britain's Son […]

And it is difficult to wish for a larger contribution, or a longer experience at foreign courts,

and the fair strength and fire of loyal Strafford:

What in a Collegue could he more desire
Than Loyal Strafford's prudent Force and Fire?
By long Experience vers'd in Foreign Courts,
He aids their Sovereigns, and his own supports. (*Trapp, 1713*)

The political sympathies of Bevil Higgons were more than obvious. The son of Sir Grenville and first cousin of Count Grenville, he originated from a Jacobite family, and followed former King James II into exile in France after 1688. And yet, he was not imbued with the French spirit and in his poem about the Peace, devoted to the Earl of Oxford, he says that Britain whose "Blood like Water spilt" could but be saved when "[...] balmy Peace her Wounds cou'd only heal." Bourbon (King Louis) should listen to the verdict of the British Queen, and after that the belligerent countries will put on peaceful clothes:

Attend, O Bourbon, and receive thy Doom,
From Britain's Queen by Heav'ns Command I come.
In Peace let Austria wear his Iron Crown,
The trembling Lombard dread his awful Frown.
His dear-bought Lands let crafty Savoy keep,
And underneath his Alpes in Safety sleep. […]
By strong Barriers let Belgia guarded be,
And only fear her ancient Foe the Sea;
Then lasting Friendship shall your Nations join,
And Bourbon be preferr'd to Austria's Line […]

Like Trapp, the poet praises the sanity and strength of the British Queen—all nations wait for her solution:

[…] Thy QUEEN has triumph'd more
Now by her Goodness, than her Arms before;
Expecting Nations her Decision wait,
Let her Decrees be mine, and Europe's Fate.
Britannia's QUEEN to Tenderness inclin'd,
Assumes to France a more pacifick Mind […]

Higgons emphasized the patience and wisdom of the Earl of Oxford and Viscount Bolingbroke, who led to the conclusion of the glorious peace:

This Harley saw, and touch'd with gen'rous Grief,
Flew to his Country's, and his QUEEN's Relief;
Him St. John follow'd, proud to be Disgrac'd,
With Harcourt join'd, the Gen'rous Cause embrac'd.

It is noteworthy that Higgons mentioned the economic consequences of the Peace of Utrecht: Anna broke up the clouds of war, and now traders would not be afraid of dangers, winds and seas. They were now under strong protection, and unknown nations would become Britain's friends:

Here suppliant Crouds for ANNA Heav'n invoke,
For ANNA's Life the new-rais'd Altars smoak,
The Merchant now shall sail with every Breeze,

And fear no Dangers, but from Winds and Seas.
His yearly Fleets Silurian Harley sends,
And unknown Nations make Britannia's Friends. (*Higgons, 1713*)

Thomas Parnell (1679–1718) is close in spirit to the first two above-mentioned poets. Parnell was born in Dublin into a wealthy family and became deacon in the Episcopal Church. He was member of the Scriblerus Club—an informal group of friends that included Jonathan Swift, Alexander Pope, John Gay, John Arbuthnot and Henry St. John. Robert Harley occasionally joined the club for meetings. Thomas Parnell's poem is dedicated to the Queen, because he identifies the peace concluded in 1713 as the peace of Anne. At the beginning of the poem, he called the Queen "mother of plenty and daughter of the sky". For twelve years Britain had suffered from losses and blood, but with the help of her valiant arms Britain defeated the Gaul (France), which had pursued the idea of universal monarchy:

Now twelve revolving years has Britain stood
With loss of wealth and vast expence of blood
Europa's Guardian; still her gallant arms
Secur'd Europa from impending harms.
Whilst Gaul, aspiring to erect a throne
O'er *other empires, trembled for her own,*
Bemoan'd her cities won, her armies slain,
And sunk the thought of universal reign.

Parnell raised the issue of balance of power in the world, which was very urgent in international law at that time. He noted how difficult it was to rally the British allies. Having won the war and showing width and depth of thought, Anna acted as a guardian of public order and returned social values and peace:

This done, the Guardian on the wing repairs
Where Anna sat revolving publick cares
With deep concern of thought. Unseen he stood
Presenting peaceful images of good
On Fancy's airy stage; returning Trade,
A sunk Exchequer fill'd, an Army paid,
The fields with men, the men with plenty bless'd,
The towns with riches, and the world with rest.

As his colleagues, Parnell praises the faithful servants of the Queen—Oxford and Bolingbroke:

Her Oxford prudent in affairs of state,
Profoundly thoughtful, manifestly great
In ev'ry turn, whose steddy temper steers
Above the reach of gold or shock of fears […]
These toils the graceful Bolingbroke attends,
A Genius fashion'd for the greatest ends […]
When schemes are fix'd, and each assign'd a part,
None serves his country with a nobler heart […]

The poem is full of praises to the blessed Anne, who brought good fortune and abundance

in all spheres of life:

She comes the Blessing comes, where'er she moves
New springing Beauty all the land improves […]
She comes the Blessing comes in easy state,
And Forms of Brightness all around her wait:
Here smiling Safety with her bosom bare
Securely walks, and chearful Plenty there;
Here wond'rous Sciences with Eagles sight,
There Liberal Arts which make the world polite,
And open Traffick joining hand in hand
With honest Industry, approach the land.

The poet comes to the conclusion that the most important global value is peace (*Parnell, 2024*).

When the ministers of Queen Anne were negotiating with France, Tickell published "The Prospect of Peace", a poem which aimed at reclaiming the nation from the pride of conquest to the pleasures of tranquillity. How far Tickell, whom Swift afterwards mentioned as "Whiggissimus", had then connected himself "with any party I know not"—so said Samuel Johnson about one of the poets who had turned their creativity to the conclusion of peace. However, in the "Spectator", Addison who was known for his Whiggish sympathies praised a poem by Thomas Tickell (1685–1740), the son of a clergyman and professor of poetry at Oxford. And rightly so, even if we take into consideration the statement of the same Johnson that "[...] The Haughty Gaul in ten campaigns o'er thrown, [was] a poem to be approved rather than admired." (*Richetti, 2005, p. 193*)

One of the most remarkable qualities of "The Prospect of Peace" was the fact that it praised the result of the Tory policy—peace. However, the military and diplomatic achievements leading to peace occurred while the Whigs were in office. And the distinctive feature of Tickell's poem is its genuine, consistent character – way to peace is in its rhymes. In the poem there are no repetitions and unnecessary comparative images, which are characteristic of the above-mentioned authors, even if the poetic part of the work suffers from it. The protagonist of the poem is Britain.

Tickell writes that "His proud Bulwark smoaking on the Ground […], his Legions did the Fight decline", but "At Her Decree, the War suspended stands, And Britain's Heroes hold their lifted Hands". Describing the exploits of "proud heroes" in the field of war from Flanders to Germany, Tickell does not forget them:

Our eager Youth to distant Nations run,
To visit Fields, their valiant Fathers won;
From Flandria's Shore their Country's Fame they trace,
Till far Germania shows her blasted Face.

Heroes are all those who had contributed to the victory of England in the War of the Spanish Succession: the diplomat Stepney, the Duke of Marlborough, the "Holy" Bishop of Bristol, Lord Grenville, Robert Harley etc. Spreading the influence of his strong and fair Queen all over the world to those who want her friendship, Tickell thinks on a large scale. Into this world—as one of the first among English poets—he included Russia, a mighty great power that

needed to be civilized:

Who conquers, wins by Brutal Strength the Prize;
But 'tis a Godlike Work to civilize.
Have we forgot how from great Russia's Throne
The King, whose Pow'r half Europe's Regions own,
Whose Sceptre waving, with one Shout rush forth
In Swarms the harness'd Millions of the North,
Through Realms of Ice pursu'd his tedious Way
To court our Friendship, and our Fame survey! […]
His Bands now march in just Array to War,
And Caspian Gulphs unusual Navies bear;
With Runick Lays Smolensko's Forests ring,
And wond'ring Volga hears the Muses sing.

Evidently, "Churchill's sword "first of all delivered the "imperial diadem to Godlike Anna", a halo shining around her head, but peace and "European freedom" were achieved by the cost of blood.

Accept, Great ANNE, the Tears their Mem'ry draws,
Who nobly perish'd in their Sov'reign's Cause:
For Thou in Pity bid'st the War give o'er,
Mourn'st thy slain Heroes, nor wilt venture more.
Vast Price of Blood on each victorious Day!
(But Europe's Freedom doth that Price repay.)

Anna decides fates of nations in a hundred languages. Savage Indians "swear by ANNA's Name", Poles "shall own thy rightful Sway", and Louis buys her friendship with "the mighty Prize". But the peaceful achievement of the Queen would have been impossible without "faithful Nobles" and "guards of the Church" near her throne. Among them, Tickell singles out diplomats, the poet Matthew Prior, and the Bishops of Bristol, Strafford and Oxford (*Tickell, 1713*). Essentially, Tickell's critics were right commending his poem as politically neutral.

Perhaps the most famous poetic essay, which came to be identified as allegorical equivalent for the Peace of Utrecht and the political debates surrounding this event, was the poem "Windsor Forest" by Alexander Pope (1688–1744), a Catholic by confession. Dedicated to George Grenville, Lord Lansdowne, a poet and politician involved in effecting the peace treaty, the poem celebrates the Tory rule in England as the height of civilization. Pope creates an allegorical story dedicated to the values of the Peace of Utrecht, and celebrates not only the fate of science, but also of the whole world. Why "Windsor Forest"? In the winter of 1712–1713, when the poet was preparing it for the press, he wrote to his friend John Caryll: "I am endeavouring to raise up around me a painted scene of woods and forests in verdure and beauty, trees springing, fields flowering, Nature laughing." (*Sherburn, 1956, p. 168*) However, to read the poem as a mere allegory is to misread it. In his praising of a harmonious Tory state, Pope gives us his pastoral vision of an idealized nature (*Duffer, 1988, p. 1*).

At the beginning of the poem—as a metaphor of political stability of post-war Britain—a forest landscape appears:

Here Hills and Vales, the Woodland and the Plain,

Here Earth and Water seem to strive again,
Not Chaos-like together crush'd and bruis'd,
But as the World, harmoniously confus'd.

In the forest prosperity reigns, including "industry" which "sits smiling on the Plains". Pope considers it a result of the reign of Anna and the signing of peace: "Peace and plenty tell a Stuart reign". Declaring this, the poet expresses his thoughts about the Utrecht: the Whigs had rejected Louis XIV' offer of a peace treaty, and it was not until the Tories came to power that a treaty was signed and peace came to England. Thus, through Anne, the Tories returned peace to the country. Therefore, they brought plenty to England, not by way of conquest in the West Indies, as the Whigs would like to have done, but by favourable conditions for trade.

Let India boast her plants, nor envy we
The weeping amber or the balmy tree,
While by our oaks the precious loads are borne,
And realms commanded which those trees adorn.

Here the trees are British ships, or even the entire Stuart monarchy, since its traditional symbol is an oak. The poet is sure that the Tories did not only create a harmonious state but returned financial stability to England (*Pope, 1951, pp. 13–42*).

The poem can be read as a closely integrated expression of the doctrine of "concordia discors" as the desirable universal norm, a norm to which the benefits of the Peace of Utrecht are seen to conform. The idea that the numerous conflicts between the four elements in nature (air, earth, fire, and water) paradoxically create an overall harmony in the world can be traced back to the Greek philosophers: Pythagoras, Heraclitus, and Empedocles. The theory that reconciliation of opposites produces a harmony works in this poem as a fitting order for Windsor Forest. Pope sees it as the law of nature. In principle, taking the necessity for diversity, the poet manifests himself not only as a Tory: opposing forces (Whigs—Tories) should contain each other, and if one is absent, the harmony is disturbed.

He gives pastoral examples in the form of three hunting scenes, historically associated with the using of the forest in Hampshire for a royal hunt by William I the Conqueror. William established his order in the forest, and as a result the forest turned into a desert. Pope considers William the Conqueror's rule as tyranny, and contrasts its despotic and savage nature to the new Stuart stability. Even the nickname of William—Nimrod (the traditional personification of a cruel hunter, tyrant and warlike man)—pointed to the absurdity.

By naming William I, a tyrant Pope had the opportunity to attack William III of Orange because they had much in common. Both were foreigners, both liked hunting and war, and even their deaths were hastened by riding accidents. The poet condemned the burden of taxes and heretical tendencies of Dutch theology under William:

Aw'd by his nobles, by his commons curst,
Th' Opressor rul'd Tyrannick where he durst,
Stretch'd o'er the Poor, and Church, his iron rod,
And served alike his Vassals and his God

In contrast to William, Pope represents the succeeding monarch as pitying her subjects, observing the forest's laws and happily looking at peaceful villages. Anna replaced Nimrod of the Whig era.

Britannia is godless, who rears

He cheerful Head, and leads the Golden years. (*Pope, 1951, pp. 73–76, 91–92*)

Borrowing from Ovid's "Metamorphosis", in another hunting scene Pope gives a somewhat different interpretation of the famous myth of Pan and Syrinx. Competing with Olympus, the forest is full of deities. Syrinx was a nymph who lived in Arcadia, revered Artemis and strictly preserved her virginity. Once, Pan met the nymph and tried to chase her, but Syrinx ran to the river Ladon and begged her sisters, the naiads, to save her. Naiads transformed Syrinx into cane that mournfully sounded in the wind. Pan made a flute out of that cane, bearing the name of the nymph (in Greek syrinx means "flute"), and he loved this unpretentious tool.

Embodying the flow of the Thames, Lodona in the form of Syrinx goes on a hunt beyond the forest's boundaries, fires a desire in Pan and begins to flee from him. Pan overtakes her, rapes her, and then Lodona apologizes to the Goddess Diana the Huntress. This scene is both political and pastoral. Its pastoral meaning is an illustration of the necessity of harmony—nature has the capacity of violence when humans ignore natural limits. In a political sense, Lodona represents the Whigs continuing a war that has become a heavy burden for the British. Thus, they violated the harmony, which, in contrast, was embodied by the Tories concluding the Utrecht peace and reflecting the "concordia discourse" of the forest. Anne, who acts as a Diana of the woods, appears as a divine incarnation of the peace, as an earthly God, able to create order out of chaos:

At length Great Anna said – let Discord cease,

She said, the World obeyed, and all was Peace. (*Pope, 1951, pp. 327–328*; *Williams, 1987, p. 60*)

Anne roams Windsor Forest as a huntress, but as a peaceful one. She controls the process of hunting in accordance with the supreme law of nature—the order in a variety. Around her, there is a picture of economic prosperity shown by silver eels and golden carps in the river. In principle, the poem represents man as an aggressive animal, personified in the images of William I and III.

Forest is an allegory, a microcosm of the universe, intended for the protagonist of Pope—his patron and inspirer of the poem, Grenville. An assured person, Pope shows him true life, emphasizing the benefits of peace, which promoted not only economic, but also spiritual and intellectual prosperity. Sir William Trumbull, a former Secretary of State, retires to Windsor Forest and transforms gradually from a statesman to an intellectual. In the forest, Trumbull studies chemistry, astronomy, religion, and other subjects by contemplation rather than by experience. His rejection of politics and war proves the merits of a harmonious life and a compromise between the Tories and the Whigs.

In another contemplative scene, an imaginary poet (here Pope keeps in mind Grenville himself, who was also a poet, and for whom it was time to leave politics and to turn to poetry) returns to Windsor Forest and asks the muse to help him find inspiration. Turning to them, Grenville embraces the end of the war and the return to the harmony of Windsor Forest as a goal of contemplation and reflection. The muse calls him to glory the British monarchs who had won victories over France, and fought for the unity of the kingdom—Edward III, Henry VII, Edward IV, and others. Pope is proud of the fact that England had always surpassed France.

In the final part of the poem, London appears as centre for world trade uniting people and

England as a model of prosperity in the world. The poem ends by "concordia discourse" in the world, the stability of which was provided by the Treaty of Utrecht (*Pope, 1951, p. 54*; *Duffer, 1988. p. 12–15*).

As a result of my review of Pope's poem it should be added that it is difficult to attach a pure political label to the author. While praising the reign of the Tories, he glorifies peace, universal reconciliation and agreement, and unlike Trapp and Parnell, does not sing praises to major Tories like Oxford and Bolingbroke. Well-known was his friendship with the Whig writers Addison—he contributed to the staging of a play by Addison—and Steele.

Poems of the other above-mentioned authors praising the peace agreements, Queen Anne, Britain, or Oxford are no less solemn, and carry no fewer ideas. For example, the poem of a London customs officer Henry Crisp, who was inspired by the economic prospects of the Peace of Utrecht, was his only published work. Here one important feature characteristic to all poets who responded to the Utrecht Peace is worth noting. All of them emphasized British political and commercial supremacy in the world, based on the knowledge that England is ahead of other states in economic development. And peace is natural and beneficial for it. At the same time, common metaphors of peace in poetic language were water (river or ocean) and ships (Britain) as a sign of freedom of movement and the restoration of trade. The need for freedom was dictated by physical security, and so all warships should be converted into trading ships, the guns of which had been so far used only for fireworks. For example, Trapp's ships "Greet alternate, all the Ocean o'er / And only in saluting Thunder roar", Crispe's ships "saluting Thunders rend the Sky", while William Waller's ships "vent their Thunder only to salute". Wesley's "A Hymn on Peace" shows the ships not carrying welfare to the world by war, but by return to trade, which is protected by a peace-loving God (*Trapp, 1713, p. 17*; *Waller, 1713, p. 7*; *Crispe, 1713, p. 13*; *Wesley, 1713, pp. 10–11*; *Smith, 1713*).

In the poems about peace, the poets used a positive "modern" argument—opposition of the constructive trade to the destructive "ancient" war. In fact, they illustrated the clash of "Pax Romana" and "Pax Britannica", ethics of war and ethics of trade. Of course, "Pax Romana" was personified by France. In the poem "Pacata Britannica", England has exceeded "Rome", and leads the world into a new era:

What she th'Old World's Extremest Limits drew,
We make a Passage only to New;
Beyond her Fabled Pillars we prevail,
And triumph, where she trembled but to sail.

A year later, an unknown poet, in a poem dedicated to Bishop John Robinson, said that the nations had fought with each other for a long time, but together with the "Europe Godlike Abitress", the Bishop had reached what "Caesar by the Sword could scare obtain". As can be seen, the Roman conquest and the British civilization are the antithesis of "peace-loving" Poets (*Newcomb, 1713, p. 7*; *The Congress…, 1714, p. 4*; *Weinbrot, 1993, p. 237*).

The analysis of the representation of Utrecht Peace in English poetry would be incomplete without mentioning two other well-known artists of the time—Joseph Addison and Matthew Prior.

Joseph Addison (1672–1719) responded to conclusion of peace creatively, but in a different way. His literary and political activity was associated with the Whigs: in 1704 he composed for

the government a poem titled "Campaign" in honor of the victory of Marlborough at Blenheim. In the same year, Addison was appointed to the Appeal Commission, and a year later occupied the position of an assistant to the Secretary of State. In 1706, he accompanied Count Halifax in an important diplomatic mission to Hanover. Two years later, Addison was elected to parliament, and from 1708 to 1710 served as the Chief Secretary of the Irish Viceroy.

The Whigs considered the Treaty of Utrecht as "destructive to the freedom of Europe"—no wonder that the Tory poets highlighted in their poems the dictate of Britain in the world. After reading the "Windsor Forest", Addison experienced an overwhelming grief because of its "aristocratic" conclusion (*Cummings, 1988, p. 143–158*). Addison premiered the tragedy "Cato" at Drury Lane on 14 April 1713 just a few days after the signing of the Peace of Utrecht amidst this foray of war and peace. It is no coincidence that the core of Cato is the conflict between those who seeks peace represented by Julius Caesar and the advocates of war under the leadership of Cato Uticensis. From its first performance, the play proved to be an immediate success and did not leave the English stage until the end of the century. "Cato" was enthusiastically accepted by all spectators, regardless of their party orientation: the Tories saw in the figure of Caesar an embodiment of the successful military leader, yet dangerous for the country (Marlborough), the Whigs praised Cato as a personification of courage, freedom and resistance to tyranny. Addison allowed the victorious Caesar to pursue peace while the defeated Cato seeks war. The events were taking place immediately after Caesar's decisive victory at Pharsalus and Thapsus. With such decisive victories Caesar did not need to court the defeated and weak Cato to accept his peace proposal. However, Caesar displays unrelenting determination to procure peace in the face of Cato's adamant rejection. By 1710, England was in a position similar to that of Caesar. Like Caesar England's forces had achieved decisive victories in several battles. In spite of England's advantageous military position, the Queen and her minister Oxford were determined to achieve peace and sign the Treaty of Utrecht.

Before Caesar's peace proposal is revealed, Addison stresses that peace is the sacred demand of the gods. Cato's friend and ally, Lucius, urges the Senate to accept peace:

My thoughts, I must confess, are turned on peace.
Already have our quarrels filled the world
With widows and with orphans: Scythia mourns
Our guilty wars, and earth's remotest regions
Lie half unpopulated by the feuds of Rome.
'Tis time to sheathe the sword and spare mankind.
It is not Caesar but the gods, my fathers,
The gods declare against us and repel Our vain attempts.
Now let us show submission to the gods. (*Bruin et al., 2015, p. 123–141*)

By Addison, Caesar is the instrument of the gods who executes their victorious wars and procures their wishes for peace. Thus, peace becomes a sacred mission that has to be embraced and accomplished. War, on the other hand, is dramatized as the tragic choice of Caesar's opponents. Cato, who promotes war, is defeated on both military and moral levels. At the same time, Addison's position is complex; not in vain there were the critical evaluations of the tragedy, reproaches regarding rhetorical aspects and ambiguity. Life, peace, and love do win in the play, and political defeat does not mean the loss of values of life.

Matthew Prior (1664–1721) did not write a poem about the Peace of Utrecht, but his work as a diplomat directly related to this event. The son of a Nonconformist, he is one of those who emerge from obscure origins to great eminence. He was educated at Westminster School and then at St. John's College, after which he took his BA degree and wrote poetry. One of his schoolfellows and friends was Charles Montagu, 1st Earl of Halifax. Thanks to Montagu, Prior became secretary to the embassy in The Hague, took part in the conclusion of the Peace of Ryswick in 1697 and in the signing of the Partition Treaties in 1698–1700. His poetic talent however was doubted by Pope. When Halifax was impeached, Prior voted on the Tory side and, therefore, did not participate practically in the diplomatic activities until 1710. After the return of the Tories to power in that year, Prior held a prominent position in all bilateral negotiations with the French court and in the conclusion of peace between England and France. It is no accident that the Treaty of Utrecht was often called "Matt's Peace" in political circles. Perhaps fatigue and the pressure of diplomatic work contributed to his lack of response to the conclusion of the Peace. Moreover, a significant factor may have been the lack of appreciation from his colleagues to his verses on the occasion of the victory of the Duke of Marlborough at Blenheim in 1704, and a poem in honour of the victory of the same commander at Ramilli in 1706 (written entirely in the Whig spirit). Comparison of Marlborough with an eagle bearing the thunder of Jupiter was considered as light-minded and futile:

High as Olympus I my flight will raise,
And latest times shall in my numbers read
Anna's immortal fame and Marlborough's hardy deed.
As the strong eagle in the silent wood,
Mindless of warlike rage and hostile care,
Plays round the rocky cliff or crystal flood,
Till by Jove's high behests call'd out to war […] (*Prior, 1704*; *Prior, 1706*)

In fact, Prior wished no wisdom as a statesman, but elegance as a poet. He apologized for his poetry by claiming that his hours were absorbed by public business, the business of diplomacy. The apology is of course itself, highly diplomatic. Diplomacy, far from annoyingly "interrupting" his career as a poet, defined his most successful and mature works (*Brunstrom, 2014*).

Discussion

As a result, I can conclude that in this period the relations between war and peace tended to have legal justification, and gravitated to the principles of justice and legitimacy. They went hand in hand with studies in the field of international law and propagandist works, part of which was poetry. The peace treaties, as, in fact, a declaration of war, were seen as a key category of fixed boundaries between war and peace, stability and chaos (*Klesmann, 2007*).

The long years of conflict paradoxically forged a growing sense of "Europe" as an international society, and artistic depictions of the Treaty of Utrecht highlighted both the European character of the Peace as well as the proto patriotic sentiments that it stirred. The perception of the Utrecht Peace by English poets, who responded to this event, was emotionally positive, and their poems dedicated to this occasion differed only in style. They had to provide corresponding representation of this important act for England and to glorify her heroes. It is

noticeable that some poets glorified the act of the peace and its architects, in contrast with previous military actions, while others made it clear that its heroes—military commanders and diplomats—created the foundation of the Peace of Utrecht during the war. The most successful poetic perception of the Peace of Utrecht were surely "Windsor Forest" by Pope, and politically neutral—"The Prospect of Peace" by Tickell.

The authors of poems could at the same time be guided by political beliefs, by career considerations, and personal emotions—peace is always welcome! But regardless of party dependency, the poets carried out the main political idea in their writings—the idea of British superiority and a peaceful way to achieve one. The Tory Peace was also praised by poets tending towards Whiggism. Thus, the Utrecht Peace was an event not only of political, but also of human and universal importance.

On the whole, the long years of the War of the Spanish Succession have contributed to the growing perception of Europe as an international community, and the literary representation of Peace appeals to a return of material well-being and affluence for subjects and cordial relations between sovereigns. Moments of pacification are symbols in their right.

Conclusion

The conducted research on the poetic representation of the Peace of Utrecht (1713) in English literature demonstrates that this event functioned not only as a major political and diplomatic act but also as a significant cultural phenomenon that found vivid reflection in early eighteenth-century poetry. The peace congresses of the Westphalian system served a dual function—juridical and symbolic—establishing a new international order while simultaneously representing the political power and cultural dignity of the participating states. For English society and its intellectual elite, the Treaty of Utrecht signified not merely the end of the long War of the Spanish Succession but also the consolidation of the national idea of British supremacy, which determined the general pathos of the poetic discourse of the time.

The poets' perception of peace transcended the boundaries of partisan ideology dividing Tories and Whigs. As the analysis of the works of Joseph Trapp, Bevil Higgons, Thomas Parnell, Thomas Tickell, and Alexander Pope shows, they were united by a desire to interpret peace as the highest expression of state reason, humanism, and the triumph of order over chaos. Despite the political sympathies of their authors, the central idea was the glorification of peace as the foundation of Britain's prosperity and well-being. For some poets, Queen Anne embodied the image of a wise ruler who ensured European harmony (Trapp, Parnell); for others, she appeared as the supreme arbiter restoring the balance of power among nations (Higgons, Tickell). In Pope's Windsor Forest, Anne is elevated to the level of a divine peacemaker, while peace and prosperity are depicted as the natural state of both nature and humankind.

An important outcome of the study lies in identifying a general intellectual tendency in English poetry of the 1710s—a synthesis of political discourse, civic pathos, and allegorical symbolism. Images of the forest, the sea, ships, rivers, and deities of peace served as metaphors for the new economic and cultural reality of Britain, where trade and progress were opposed to the destructive wars of the Old World. The poets thus constructed a poetic model of Pax Britannica, emphasizing the country's historical mission as the guardian of equilibrium in Europe. The aestheticisation of peace and its heroes became an instrument of national identity

and a subtle form of political propaganda.

Equally significant is the emotional and personal dimension of these works. In the poems of Trapp, Parnell, and Higgons one finds recurring motifs of relief, gratitude, and hope—mirroring the collective sentiment that accompanied the end of war. For the English intelligentsia of the early eighteenth century, peace represented not only diplomatic victory but also moral renewal. Within this context, Pope's creativity occupies a distinctive position: he transformed a political event into a philosophical parable about harmony in nature and society, where peace emerges as an inherent law of existence.

Even Whig poets, often critical of the "Tory peace," ultimately perceived the Treaty of Utrecht as a national achievement. The works of Tickell and Addison reflect a striving for reconciliation and for Britain's civilising mission in Europe. The literary process of the early eighteenth century thus reveals a gradual formation of a national consensus grounded in the idea of peace as the highest form of political wisdom and cultural progress.

The analysis of poetic representations makes it possible to conclude that the Peace of Utrecht became a point of intersection between artistic creation, political ideology, and cultural memory. The poets interpreted it not only as a specific historical act but also as a metaphor for the transition from an age of war to an age of rational statecraft. The poetic image of peace performed the function of collective self-identification: Britain appeared not simply as a victor but as a moral leader capable of establishing a just order on the continent.

In a broader historical and cultural perspective, this reflects the emergence of a new model of public consciousness in which the concept of peace acquired juridical, ethical, and aesthetic dimensions. In the poets' understanding, peace was not merely a diplomatic treaty but also a state of inner harmony—a symbol of national maturity and civic responsibility. This constitutes the key innovation of the literary representation of the Peace of Utrecht: the fusion of political and moral principles, and the affirmation of concord as the supreme value of civilisation.

Thus, the poetry of Queen Anne's reign reflects Britain's transition from a feudal-dynastic to an Enlightenment model of political thought, in which the poet's word becomes an instrument of social concord and peaceful coexistence among nations. The Peace of Utrecht, embodied in poetic imagery, was not only the diplomatic outcome of the War of the Spanish Succession but also the spiritual emblem of a new European order founded upon the principles of justice, balance of power, and mutual respect among states.

Conflict of Interest

The author declares that there is no conflict of interest.

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Nina N. Gontar [a][4]

Hybrid Justice in the Russian Federation, 2020–2025: The Impact of the Link between E-Justice, Court-Annexed Mediation and ODR on the Quality of Judicial Reasoning and the Stability of Judgments in Appeal and Cassation (Micro-Level NLP Analysis and Quasi-Experiment) [3]

Abstract:
The article presents a comprehensive analysis of the impact of digital reforms carried out in 2020–2025—namely e-justice, online proceedings, and court-annexed mediation—on the quality and stability of judgments delivered by courts of general jurisdiction in the Russian Federation. The relevance of the study lies in the need to assess the effects of large-scale judicial digitalisation not only through quantitative indicators but also through substantive criteria such as argumentation, coherence, and predictability of judicial reasoning. The scientific novelty of the research consists in developing and applying an interdisciplinary framework combining a quasi-experimental *difference-in-differences* methodology with natural language processing (NLP) tools to measure the cognitive quality of judicial reasoning. The subject of the study includes judges and litigants engaged in the use of electronic procedures and mediation practices. The object of the study is the hybrid model of justice that integrates digital technologies, mediation, and online dispute resolution (ODR). The study aims to identify and quantitatively assess the influence of digital and mediation instruments on the quality of judicial reasoning and the resilience of decisions in appeal and cassation proceedings. The study employs quasi-experimental and empirical–statistical methods (difference-in-differences, panel regression, event-study), as well as natural language processing (NLP) tools to assess the cognitive quality of judicial reasoning based on open data from the Judicial Department, the Supreme Court of the Russian Federation, and international court corpora (PCT, TOL, BAILII). The empirical basis comprises a corpus of judicial acts issued in 2020–2025, analysed using NLP models and statistical methods. The findings demonstrate that the introduction of electronic document management, video hearings, and mediation procedures statistically significantly improves the quality of judicial reasoning (by 10–12%) and reduces the proportion of overturned decisions in appeals and cassations (by 8–10%). The strongest effects are observed in civil and family cases, where the communicative interaction of the parties plays a decisive role. A comparative analysis with Italy and the United Kingdom revealed that Russia has completed the stage of primary digitalisation, approaching European standards of judicial quality while maintaining a gradual and adaptive institutional development model. The author concludes that hybrid justice represents a stable trajectory in the evolution of 21st-century judicial systems: the combination of digital technologies and conciliation procedures enhances transparency, argumentative depth, and the legitimacy of justice. The effectiveness of these reforms, however, depends not only on technological factors but also on cognitive and ethical dimensions—judicial training, the development of mediation institutions, and the preservation of judicial autonomy in reasoning.

Keywords: e-justice; hybrid justice, courts of general jurisdiction; mediation, online dispute resolution (ODR), quality of judicial reasoning, stability of decisions, difference-in-differences, judicial text analysis, natural language processing (NLP), comparative justice.

Abbreviations:

DiD is difference-in-differences,

ODR is online dispute resolution,

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OJL is Open Justice Lab,
NLP is natural language processing
PCT is Processo Civile Telematico,
RQS is Reasoning Quality Score,
RSE is robust standard errors,
TOL is Tribunale Online.

Introduction

In recent years, the Russian judicial system has undergone a large-scale digital transformation encompassing not only the technical aspects of document management but also the fundamental elements of the legal process—the communication between parties, methods of evidence presentation, procedures for rendering judgments, and their subsequent appeal or cassation. The period 2020–2025 has been marked by the active implementation of e-justice mechanisms: the operation of "electronic cabinets" for parties to proceedings, remote participation in hearings via videoconferencing, automated case allocation, and full electronic document workflow. Parallel to these digital innovations, the institutions of conciliation procedures—primarily mediation and the emerging *ODR* systems based on it—have been consolidated in judicial practice. The combination of these developments has shaped a new model—hybrid justice—which integrates digital technologies with human-centred mechanisms of dispute resolution.

The relevance of this study lies in the fact that neither Russian nor international practice has yet developed stable criteria for assessing the impact of digitalisation and mediation on the substantive quality of justice—i.e., on the reasoning, motivation, and stability of judicial acts when reviewed on appeal or in cassation. The priority of state judicial policy remains the reduction of case duration and the enhancement of procedural accessibility, yet quantitative indicators do not always correlate with the quality of legal reasoning or the depth of factual analysis. As artificial intelligence and automated document management algorithms are increasingly employed in the judicial sphere, there is an urgent need for systematic monitoring of their consequences for the legitimacy and predictability of judicial decisions.

The scientific novelty of the research lies in formulating and addressing an interdisciplinary task—analysing the impact of the "e-justice—mediation—ODR" triad not on general statistical indicators of efficiency but on the quality of judicial reasoning and the stability of judgments in appeal and cassation. Unlike most previous studies, which are limited to evaluating procedural speed or judicial workload, this paper considers the quality of a judgment as the outcome of a cognitive and communicative process altered by digital interfaces and conciliation practices. The use of *NLP* and the quasi-experimental difference-in-differences approach enables the identification of causal effects of digital and mediation reforms at the micro level—within the structure and content of judicial texts.

The subject of the study encompasses judges, litigants, and mediators engaged in the use of electronic and online forms of interaction.

The object of the study is the hybrid model of justice in Russia, grounded in the integration of e-litigation, court-annexed mediation, and *ODR* mechanisms. This model is conceptualised

as a dynamic system in which technical and communicative components jointly shape new standards of judicial performance.

The study aims to empirically identify and theoretically explain the influence of digital and mediation tools on the quality of judicial reasoning and the stability of judicial acts in review procedures.

To achieve this aim, the following objectives were defined:

- analyse the legal and institutional frameworks for implementing e-justice and mediation in Russia;
- define measurable indicators of the quality of judicial reasoning and to design a method for their automated assessment using *NLP* technologies;
- compare the dynamics of these indicators across courts actively employing electronic procedures and mediation with those of traditional courts;
- determine the presence and magnitude of the reform's effect on the stability of judicial acts in appellate and cassation review;
- develop recommendations for improving digital and conciliation instruments with a view to enhancing the overall quality of justice.

The practical significance of the study lies in the potential application of its findings for improving state judicial policy, developing internal audit methodologies for assessing the quality of judicial reasoning, and optimising the professional training of judges and mediators. For judicial administrators and developers of digital platforms, the study's results may inform the refinement of interfaces and service algorithms in light of their impact on the quality of legal reasoning. For mediators and specialists in alternative dispute resolution, the findings offer deeper insight into how the online format affects perceptions of fairness and the willingness of parties to reconcile. For legal scholars and researchers of digital governance, the study provides an empirical basis for constructing new models of judicial efficiency assessment in the context of the digital economy.

Thus, the presented research contributes to forming an integrated scholarly understanding of hybrid justice as a new stage in the evolution of the Russian judicial system—one in which technological innovation and humanistic approaches to dispute resolution do not conflict but interact, creating a resilient and adaptive legal environment.

Methods

The study is based on an interdisciplinary methodology combining legal, institutional-economic, statistical, and digital-analytical approaches. Since the object of analysis is a hybrid model of justice that encompasses formal legal, technological, and communicative components, the methodological framework integrates both classical legal methods and quantitative and computational text-analysis instruments. The purpose of this comprehensive strategy is to obtain not merely a descriptive but also a causal-explanatory picture of how digital and mediation reforms affect the quality of judicial decisions and their stability upon review.

The first stage involved a systematic analysis of the legal and regulatory framework of the Russian Federation governing e-justice, mediation, and other forms of alternative dispute resolution. The study examined the provisions of Federal Law No. 262-FZ *On Access to*

Information on the Activities of Courts (as amended 2020–2024), Federal Law No. 123-FZ *On Alternative Dispute Resolution with the Participation of an Intermediary (Mediation Procedure)*, the Codes of Civil, Commercial, and Administrative Procedure, as well as the by-laws of the Judicial Department under the Supreme Court of the Russian Federation regulating the operation of the "Electronic Case File" system, online submission of documents, and video hearings. In parallel, an institutional analysis was performed of the development of court-annexed mediation, including pilot projects of the Ministry of Justice and the Council of Judges of the Russian Federation.

The comparative-law section encompassed international models of e-justice: the Italian *PCT* and *TOL* platforms, the UK *Online Civil Money Claims* system, and the Council of Europe and OECD recommendations on *ODR* (2021–2024). Their examination served as a benchmark for comparing the structural and procedural features of the Russian reforms and for verifying the universality of the observed effects.

The empirical database includes:

- judicial statistics from the Judicial Department under the Supreme Court of the Russian Federation (https://cdep.ru) for 2018–2024, containing indicators of caseload, case duration, appeals, and reversals;
- data from the official portal of judicial statistics (https://stat.cdep.ru), presenting aggregated tables by type of proceedings and region;
- open datasets of judicial acts (the *State Automated System "Justice"*, https://sudrf.ru) and regional court portals;
- texts of appeal and cassation rulings of the Supreme Court of the Russian Federation (https://vsrf.ru);
- data on mediation practice from the Ministry of Justice, the Federal Institute of Mediation, and regional reconciliation centres;
- international corpora of judicial acts (Italy, the UK, Canada) accessed via EuroCases, Italgiure Web, BAILII, and CanLII.

Based on these sources, a micro-panel of at least 15,000 judicial decisions of Russian courts of general jurisdiction for 2020–2025 was constructed, annotated with attributes such as region, court level, case type, and appellate outcome. Separate subsamples were created for courts participating in pilot projects on electronic document management and court-annexed mediation. All texts were anonymised and stripped of personal data in accordance with research ethics and data-protection legislation.

To establish causal relationships between the implementation of digital and mediation tools and changes in the quality of judicial reasoning, a quasi-experimental *DiD* methodology was applied. The 2020–2025 period enables observation of the phased introduction of electronic technologies across Russian regions, forming a natural "staggered" design in which courts are incorporated into reform at varying times.

The control group consisted of courts where digitalisation was delayed or partial. Dependent variables include indicators of reasoning quality (see below) and the proportion of overturned decisions in appeal and cassation. Models were estimated with regional and temporal

fixed effects and covariates (case type, number of judges, workload, regional digitalisation index).

An extended specification was used:

$$Y_{it} = \alpha + \beta EJustice_{it} + \gamma Mediation_{it} + \delta(EJustice_{it} \times Mediation_{it}) + \mu_i + \lambda_t + \epsilon_{it},$$

where

Y_{it} is the reasoning-quality metric;

$EJustice$ and $Mediation$ are implementation indicators;

μ_i and λ_t are fixed effects;

ϵ_{it} is the error term.

Robustness was tested through event-study plots and placebo tests to exclude pre-reform anticipation effects.

For textual assessment, a suite of *NLP* methods adapted to Russian legal texts was used. Morphological normalisation and syntactic parsing were performed with *spaCy ru*, *Natasha*, and *DeepPavlov*. The following indicators were then constructed:

- Structural completeness index is share of sentences containing legal references and logical connectors ("because", "therefore", "at the same time");
- Legal argumentation index is number of unique citations of laws, precedents, and doctrinal sources;
- Coherence index is average semantic similarity between paragraphs (cosine similarity of sentence-BERT embeddings);
- Reasoning depth index is ratio of the reasoning section to the total decision length;
- Linguistic complexity index is average sentence length and Flesch–Kincaid readability score for the legal Russian corpus;
- Template index is share of repeated formulaic expressions indicating standardised drafting.

Each indicator was normalised and aggregated into the composite *RQS*, the dependent variable in econometric models. Additional metrics of emotional neutrality (sentiment analysis) and stylistic variability were calculated to reveal how digital formats and mediation affect judicial rhetoric. For cross-linguistic comparability, analogous indices were computed for the Italian *PCT/TOL* and British Online Civil Money Claims corpora, enabling international comparison.

The quantitative analysis employed *R* and *Python* packages (*statsmodels*, *pandas*, *linearmodels*, *ggplot2*). Descriptive statistics, correlation analysis, panel regressions with fixed effects, and *RSEs* were applied. Robustness checks included exclusion of outliers and alternative model specifications. Heterogeneity effects were examined using interaction terms (e.g. digitalisation × case category) and clustering of standard errors at court level. Results were visualised through event-study diagrams depicting pre- and post-reform dynamics.

Special attention was given to validating the *NLP* metrics: manual expert verification of 5% of random decisions compared automated and human evaluations, and inter-rater reliability was measured using Cohen's Kappa to ensure statistical reliability.

In addition to quantitative analysis, qualitative methods were used, including content analysis of decisions and structured interviews with judges, mediators, and court administrators. This part identified typical reasoning strategies and the formulation of conclusions under digital

conditions. Interviews were structured around three dimensions: perception of digital tools, the impact of mediation on workload, and changes in decision-writing logic.

A comparative-law method was also applied to juxtapose organisational and technological aspects of hybrid justice in Russia and the EU. OECD's *Digital Justice Framework* (*2024*) and the Council of Europe's *ODR Guidelines* (*2021*), along with Italian and UK empirical data, were analysed to build a typology of digitalisation models and correlate the Russian trajectory with European trends.

The research recognises limitations, including incomplete regional data, possible parsing errors, and external factors such as staffing changes or variations in caseloads. To minimise bias, control variables and bootstrap confidence intervals were used. Reproducibility is ensured through open algorithmic descriptions and the planned publication of code and metadata in the *OJL* repository.

Thus, the methodological framework integrates legal analysis and empirical hypothesis testing through modern digital tools. The use of *NLP* technologies and quasi-experimental methods enables the transition from describing digital reforms to quantitatively and qualitatively evaluating their real effects on hybrid justice—capturing transformations in judicial reasoning, motivation, and resilience in appellate and cassation procedures.

Literature Review

The issues of judicial digitalisation and the introduction of mediation as a tool for enhancing the efficiency of the judiciary have undergone significant development in recent years, both in Russian and international scholarship. Researchers emphasise that the digital transformation of judicial power has altered not only the forms of interaction between the court and the parties but also the very logic of legal reasoning, the structure of judicial motivation, and the standards of procedural fairness (*Susskind, 2022*; *Reiling, 2022*).

The theoretical foundation of the contemporary discourse on digital justice is Richard Susskind's concept of *online courts*, according to which justice is gradually moving from an institutional to a service–technological model (*Susskind, 2022*). This approach has been developed further in studies by the OECD (*2024*) and the Council of Europe (*Guidelines…, 2021*), where electronic platforms are viewed as instruments for improving access to justice and reducing transaction costs.

The works of Reiling (*2022*) and Cowan (*2020*) analyse the challenges of managing electronic court systems, emphasising the risks of diminishing judicial autonomy and the threat of algorithmic standardisation of judgments. Similar problems are reflected in *Online Courts—Comparative Study* (*Online Courts, 2022*), which demonstrates that the extent of digitalisation is directly dependent on the organisational culture of the judicial system.

A special place is occupied by Italian research on *PCT* and the *TOL* platform (*Antonucci, 2014*; *Mendola, 2022*; *Nissi et al., 2019*). These studies show that the introduction of mandatory electronic filing has reduced the average duration of proceedings and improved the predictability of judgments, yet it has also led to the formalisation of judicial texts and a decline in the originality of reasoning. Mendola (*2022*) demonstrates that digitalisation promotes the unification of judicial language and reduces the degree of individual interpretation.

Another group of studies focuses on assessing the efficiency of judicial systems through economic and legal methods, including production function analysis and DEA modelling (*Judicial System…, 2014*; *Nissi et al., 2019*). They confirm that the introduction of digital technologies is among the most significant drivers of institutional efficiency growth in courts, all other factors being equal.

Alongside the development of electronic justice, interest in online mediation and ODR has increased. Reviews by the OECD and SIDRA (*Online Dispute Resolution Framework, 2024*; *International Dispute Resolution, 2024*) emphasise that *ODR* has become a key element of hybrid justice, enabling a balance between the autonomy of the parties and state guarantees of enforceability. Analyses by Azmi and his colleguages (*2023*) show that online dispute resolution is most effective in small and medium-sized business conflicts and cross-border consumer cases.

Studies by Giacalone and Salehi (*2022*) and by Grajzl et al. (*2025*) provide empirical evidence that court-annexed mediation reduces the average duration of proceedings and increases the probability of settlement, particularly in family and property disputes. Canadian and British reports (*Effectiveness…, 2022*; *Alternative Dispute Resolution…, 2024*) document a steady increase in the number of cases resolved before judgment and underline that digital technologies serve as catalysts for the integration of mediation into the judicial process.

In international encyclopaedias and surveys (*Online Dispute Resolution, 2024*; *Global ODR Projects Database, 2024*; *ODR…, 2025*), ODR is viewed as the next stage in the evolution of access to justice, where efficiency is measured not by the speed of adjudication but by user satisfaction and the reduction of repeat disputes.

In Russia, the academic tradition has initially interpreted e-justice primarily as a mechanism for enhancing the transparency of court operations. Monographs edited by Gabov (*2024*) and Burdina (*2021*) provide a systematic review of the legal and technological aspects of judicial digitalisation, focusing on issues of participant identification, data protection, and verification of evidence.

Studies by Malinsky (*2021*) and Apushkina (*2022*) describe the technical and organisational barriers to implementing electronic systems in courts of general jurisdiction, including regulatory shortcomings and a shortage of qualified personnel. Works by Vashurina (*2025*) and Karasev (*2021*) highlight the constitutional and legal dimensions of digital justice, especially the principles of equal access and adversarial procedure.

A substantial contribution has been made by studies on the communicative efficiency of civil proceedings (*Sukhorukova, 2021*), which demonstrate that the quality of communication between the court and the parties is a crucial determinant of the legitimacy of judicial decisions. Ulyanov (*2024*) proposed a theoretical model for assessing judicial efficiency based on balancing speed and fairness, which is particularly relevant for analysing digital reforms.

Official data from the Judicial Department of the Supreme Court of the Russian Federation (*2024*) and the Federal Judicial Statistics Portal (*2024*) serve as primary empirical sources for evaluating caseload dynamics, case duration, and the proportion of overturned judgments. These datasets are widely used in scholarly publications but remain predominantly at the aggregate level, without textual analysis of judicial acts.

In Russian literature, the institution of mediation is seen as an alternative dispute resolution mechanism that helps reduce the courts' workload and fosters a new culture of legal

communication (*Solovyov, 2020*; *Turanin, 2024*). However, most studies focus on legal and organisational issues, while empirical analyses of mediation effectiveness remain scarce.

Comparative legal works (*Fedorenko et al., 2017*) contrast the Russian and European mediation models, highlighting the weak institutionalisation of court-annexed mediation in Russia. More recent research (*Bril et al., 2024*) shows that mediation practices are gradually spreading to family and labour disputes, although their integration into the judiciary remains fragmented.

At the international level, the Canadian Ministry of Justice (*Effectiveness, 2022*) report and SIDRA (*International Dispute Resolution…, 2024*) analysis confirm that the combination of digital platforms and mediation ensures a consistent increase in participant satisfaction, making hybrid justice the next stage in judicial system evolution.

The methodological landscape has shifted from descriptive and normative models to empirical and computational approaches. Studies by the IMF (*Judicial System Reform in Italy, 2014*), Nissi et al. (*2019*), and the OECD (*2024*) employ econometric and data-analytical tools to evaluate judicial efficiency. In legal informatics, the *Legal NLP* direction is actively developing, focusing on automatic classification of judicial acts, assessment of reasoning quality, and detection of argumentation patterns. Examples include works by Susskind (*2022*) and Mendola (*2022*), where digitalisation is treated as a factor of cognitive transformation in legal writing.

In Russia, this approach is only beginning to emerge: the works of Gabov et al. (*2024*) and Burdina and Zuev (*2021*) stress the need for tools of internal quality auditing of judgments, while *Courtmonitoring.org* (*Guide, 2024*) proposes indicators for assessing the openness and efficiency of judicial systems.

A synthesis of Russian and international literature reveals several consistent trends. First, most authors agree that digitalisation improves the transparency and speed of proceedings, though its impact on the quality of legal reasoning remains ambiguous (*Gabov et al., 2024*; *Mendola, 2022*; *Reiling, 2022*). Second, mediation—particularly court-annexed mediation and ODR—reduces the courts' workload and enhances trust in the judicial system, though institutional consolidation is still required (*Grajzl et al., 2025*; *Solovyov, 2020*). Third, Russian scholarship rarely employs quantitative methods or automated text analysis, limiting the ability to identify causal effects.

Thus, the scholarly niche of this research lies in the absence of comprehensive studies combining macro-level analysis of judicial statistics with micro-level text analytics of judicial acts. While international research increasingly uses *NLP* and quasi-experimental methods, Russian studies remain mostly descriptive. The present research fills this gap by integrating empirical and linguistic analysis, enabling the evaluation of not only efficiency but also the cognitive quality of justice in the context of digitalisation and mediation development.

Results

General Characteristics of the Empirical Findings

The quasi-experimental analysis based on the *difference-in-differences* model made it possible to identify a consistent impact of digital and mediation reforms on key indicators of the quality and resilience of judicial decisions. The research covered a corpus of more than 15,000 judicial

acts issued by courts of general jurisdiction of the Russian Federation during 2020–2025, divided into two groups: courts actively applying e-justice and court-annexed mediation, and control courts operating predominantly in the traditional procedural format.

Estimates for the main dependent variables indicate a statistically significant positive effect of digitalisation and mediation on the average level of reasoning quality in judicial acts, expressed through the composite *RQS* index. Following the introduction of electronic document management and video hearings, the mean *RQS* increased by 6.8%, while the presence of mediation procedures raised it by 9.3%. The combined impact of both factors (e-justice × mediation) demonstrated a synergistic effect—an average rise of 12.1% in *RQS* compared with the control group of courts, with a significance level of $p < 0.01$.

Differences by case category were observed: the highest growth in reasoning quality occurred in civil cases (particularly family and labour disputes), where communication between the parties and the possibility of reconciliation play a decisive role. In criminal cases, the effect of digitalisation proved weaker, which can be explained by the specific nature of evidence assessment and the limitations of remote participation.

The analysis of judgment resilience revealed a decrease in the share of reversals in appeals and cassations by an average of 8–10% in courts using both innovative mechanisms. This suggests that the improvement in argumentation and structural coherence of decisions correlates with their legal reliability.

Accordingly, the first research hypothesis—regarding the positive impact of the hybrid format of justice on the quality of reasoning and stability of decisions—received statistical confirmation. Digital and mediation reforms not only accelerate case handling but also enhance the cognitive quality of legal reasoning, shaping a stable trend towards the standardisation and predictability of judicial acts.

Results of the NLP Analysis of Judicial Texts

To assess the qualitative aspects of judicial reasoning, a set of indicators was applied, combined into the *RQS* index, which included six sub-indicators: structural completeness, legal argumentation, coherence, depth of reasoning, linguistic complexity, and textual templatisation.

After the introduction of electronic document management and the transition to standardised electronic formats of judgments, the proportion of acts containing clearly defined sections ("Case Background", "Evaluation of Evidence", "Reasoning Section") increased from 64% in 2020 to 79% in 2024. The average number of normative references to federal laws, Plenum resolutions of the Supreme Court, and other sources rose by 17%, indicating a strengthening of formal argumentation and stricter compliance with structural requirements.

Semantic analysis based on the *sentence-BERT* model showed that coherence (mean cosine similarity between paragraphs) increased from 0.71 to 0.78, especially in courts actively applying mediation procedures. The depth of reasoning (the ratio of the reasoning section to the total text length) grew from 0.46 to 0.54, reflecting a trend towards more extensive justification of legal conclusions.

Digitalisation led to a moderate reduction in linguistic complexity: the average sentence length decreased from 27 to 24 words, while the Flesch–Kincaid readability index improved by about 8%. This can be interpreted as a simplification of legal language for users of electronic

systems. The templatisation index (the proportion of recurring formulas) increased from 11% to 15%, indicating a process of standardisation and a certain degree of "de-personalisation" of decisions.

Thus, the overall RQS indicator demonstrates steady growth, with the largest contribution coming from coherence and structural completeness, and the smallest from argumentative originality. Digitalisation contributes to the standardisation of the structure and logical consistency of judicial acts, although it partially reduces the individuality of legal language.

Comparative Analysis: Russia, Italy, and the United Kingdom

For international comparison, data were used from the Italian *PCT* system, the *TOL* platform, and the British *Online Civil Money Claims* project (*Cowan, 2020*; *Mendola, 2022*; *Nissi et al., 2019*).

The Italian model is considered one of the most advanced forms of e-justice in Europe. Studies by Antonucci (*2014*) and Nissi et al. (*2019*) demonstrated that, after the mandatory introduction of electronic document management, the average duration of civil proceedings decreased by 28%, while the rate of appeal reversals dropped by 12%. At the same time, according to Mendola (*2022*), linguistic variability in judicial texts declined—the lexical diversity index fell by nearly 10%. Thus, the Italian experience reveals the same regularity as the Russian one: digitalisation increases efficiency but standardises legal language.

The British system is user-centred and integrates *ODR* elements—online dispute resolution prior to court adjudication. Research by Cowan (*2020*) and reports from the UK Ministry of Justice (*Tribunale Online Annual Report, 2024*) indicate that around 60% of cases initiated on the online platform are settled amicably without a court ruling. The average level of participant satisfaction exceeds 80%. Moreover, the length of the reasoning sections in judgments delivered online remains comparable to that in traditional proceedings, distinguishing the British model from the Italian and Russian ones, where reasoning sections tend to shorten.

Overall, the Italian system represents an "institutional-technical" path of digitalisation, the British one a "human-centred" approach focused on access and conciliation, while the Russian model lies between them, combining technological and normative-legal reforms. All three systems share greater transparency and reduced duration of proceedings, yet differ in reasoning depth: it remains high in the UK but is somewhat simplified in Italy and Russia.

Hence, the comparative analysis confirms that the effectiveness of hybrid justice depends on maintaining a balance between technological standardisation and the preservation of the judge's cognitive autonomy.

The Impact of Mediation and ODR on the Stability of Judgments

An analysis of the subsample of courts applying court-annexed mediation revealed a substantial improvement in the stability of judicial acts. On average, the proportion of appeal reversals declined from 14.2% to 11.7%, and cassation reversals from 7.5% to 6.2%. The mediation component had the strongest impact on socially and psychologically complex categories of cases—family, labour, and housing disputes.

According to correlation analysis, the existence of an agreement reached through court-annexed mediation increases the likelihood of final dispute resolution without re-litigation by a

factor of 2.3. These results correspond with international research (*Effectiveness, 2022*; *Grajzl et al., 2025*), where comparable ratios ranged from 1.8 to 2.5.

Interestingly, mediation practices enhance not only procedural efficiency but also the quality of judicial reasoning: judgments issued after unsuccessful mediation attempts contain more detailed reasoning sections than standard cases. This occurs because judges are compelled to consider negotiation materials and the parties' arguments, resulting in more elaborate and context-rich explanations.

Thus, mediation and *ODR* act not merely as mechanisms for court de-congestion but as instruments for deepening and legitimising judicial reasoning, reinforcing the perception of fairness within the judicial process.

Regional Heterogeneity Dynamics and Institutional Effects

The inclusion of regional fixed effects in the *DiD* model revealed that the influence of digitalisation and mediation is unevenly distributed across the constituent entities of the Russian Federation. The strongest effects are observed in regions with developed IT infrastructure and active implementation of the "GAS Pravosudie" and "Electronic Justice 2.0" platforms—specifically Moscow, Saint Petersburg, Tatarstan, Belgorod, and Tyumen regions. In these jurisdictions, the growth of the *RQS* exceeds 12–14%, whereas in less digitalised regions (for instance, Zabaykalsky Krai or the Komi Republic) the increase does not surpass 4–6%.

It was also noted that administrative and organisational measures—such as additional judicial training and internal quality audits of judicial decisions—exert an influence comparable to that of technological innovations. In courts where digitalisation was accompanied by reforms in management procedures, a greater improvement in the quality of judicial reasoning was recorded.

Thus, the effectiveness of reforms is determined not so much by the presence of digital platforms as by the institutional readiness of the judicial system to employ them—namely, the competence of judges, the efficiency of internal quality control, and the interaction with mediators.

Interpretation of the Identified Effects

The analysis of the obtained data makes it possible to distinguish several key mechanisms through which digitalisation and mediation affect the quality of justice.

1. Cognitive Standardisation Mechanism
   Uniform electronic forms and templates of judgments facilitate the unification of legal language and enhance the predictability of judicial reasoning. However, excessive standardisation may lead to a decline in the originality of argumentation—an effect already observed in Italian and, to some extent, Russian practice (*Gabov et al., 2024*; *Mendola, 2022*).
2. Procedural Transparency Mechanism
   E-justice simplifies oversight of judicial activities and enhances public trust in the process. The online accessibility of case materials and hearing transcripts contributes to a reduction in the number of complaints and reversals (*Reiling, 2022*; *Sukhorukova, 2021*).
3. Integration Mechanism of Conciliatory Procedures

Mediation, when combined with electronic services, creates conditions for voluntary settlement and improves the quality of subsequent judicial decisions by broadening the evidentiary base and deepening the understanding of the parties' interests (*Grajzl et al., 2025*; *Turanin, 2024*).

4. Organisational Learning Mechanism

The transition to digital formats is accompanied by an increase in the professional competencies of judges and court staff, which positively affects the internal quality audit of decisions and reduces the risk of procedural errors (*Ulyanov, 2024*).

Accordingly, hybrid justice functions as a complex system in which technological and humanistic elements mutually reinforce one another. Its effectiveness arises not from the mechanical acceleration of procedures, but from institutional adaptation and the emergence of a new type of legal reasoning.

Comparison with International Trends

A comparison of the study's results with international data (*Guidelines…, 2021*; *Judicial System Reform in Italy*, 2014; *Online Dispute Resolution Framework, 2024*) shows that between 2020 and 2025, Russia underwent a process analogous to the "primary digitalisation" phase experienced by EU countries—progressing from fragmented pilot projects to the creation of a unified national e-justice platform. Unlike Italy, where digitalisation was introduced top-down and covered all courts simultaneously, the Russian reform evolved incrementally, allowing for a natural quasi-experiment and the identification of genuine causal effects.

In terms of reasoning quality indicators, Russian judicial acts demonstrate positive dynamics, approaching the Italian standards of 2018–2019. However, the level of mediation integration remains significantly lower—according to the Ministry of Justice (*Summary…, 2025*), only about 7% of cases involve mediation procedures, compared with over 50% in the United Kingdom.

At the same time, Russia surpasses many European jurisdictions in terms of judicial data transparency: the Judicial Department's online portal provides structured datasets that enable the application of advanced data analysis methods and the construction of evidence-based evaluations of reform outcomes.

Thus, the Russian model of hybrid justice is developing in line with European trends, while maintaining its distinct features—a strong normative framework, an expanding infrastructure, and a still-limited but growing practice of mediation.

Summary of Findings

The comprehensive analysis demonstrated that the implementation of e-justice and the expansion of mediation in Russia during 2020–2025 have led to significant institutional transformations, including:

- improved structural coherence and argumentative richness of judicial decisions;
- a decrease in the number of reversals and in the duration of proceedings;
- the establishment of new standards of transparency and procedural predictability;

- increased participation of parties and expanded opportunities for voluntary dispute resolution.

At the same time, digitalisation and mediation do not replace traditional mechanisms of justice but rather transform them, creating a hybrid environment in which technological tools serve humanistic purposes—strengthening trust, enhancing the quality of argumentation, and improving the resilience of judicial reasoning.

The comparison with Italy and the United Kingdom confirms the universality of these patterns: wherever digitalisation is combined with conciliatory practices, improvements in efficiency and legitimacy follow. The distinctiveness of the Russian model lies in the gradual and adaptive nature of its reforms, which allows for a balance between standardisation and the preservation of creativity in legal reasoning.

Consequently, the results of the study confirm that hybrid justice represents a sustainable trajectory in the development of twenty-first-century judicial systems, wherein technological innovations function not as ends in themselves but as instruments for enhancing the quality of legal thought, transparency, and social justice.

Discussion

The conducted study has revealed a set of positive effects of hybrid justice while simultaneously highlighting a number of theoretical, methodological, and practical challenges that require further scholarly debate. The results of modelling and *NLP* analysis demonstrate the significant potential of digitalisation and mediation, yet their integration into the judicial system is accompanied by multiple contradictions, related both to the internal logic of the legal process and to external institutional constraints.

1. Issues of the Research Area

The central problem in the modern discourse on digital justice lies in the contradiction between the acceleration of procedures and the preservation of the depth of legal reasoning. Digital technologies are initially oriented towards efficiency, automation, and standardisation, whereas justice by its very nature demands individualisation, contextual analysis, and ethical judgment. There is a risk that the "algorithmic logic" of electronic platforms substitutes the discreteness of human cognition and diminishes the variability of argumentation (*Mendola, 2022*; *Reiling, 2022*).

In the Russian judicial system, this dilemma manifests itself particularly acutely. On the one hand, the introduction of electronic document management and video hearings has reduced judges' workloads and increased procedural transparency. On the other hand, the unification of judgment texts and the limited opportunities for live interaction between parties in online settings create the danger of transforming the judicial act into a bureaucratic document devoid of individual justification. As the *NLP* analysis has shown, the growth of the "templateness index" of decisions combined with the simplification of legal language indicates a partial loss of the *cognitive depth* of legal writing.

Equally debatable is the impact of mediation and *ODR* on the legitimacy of the judicial system. In theory, voluntary settlement enhances the parties' sense of justice and reduces social tension. In practice, however, mediation in Russia remains fragmented and is often perceived merely as a formal pre-trial stage rather than a genuine instrument of conflict resolution (*Solovyev,*

2020; *Turanin, 2024*). This limits the possibilities for integrating mediation into the judicial process and weakens its institutional foundation.

A third problem area concerns data quality and the availability of empirical information. Despite the existence of the Judicial Department's and *GAS Pravosudie* portals, most datasets lack metadata on the use of specific procedural instruments, which complicates the construction of accurate models. The absence of a unified system of case identifiers prevents the direct comparison of judgments across different instances. These limitations create risks of statistical bias and compel the researcher to rely on quasi-experimental estimations with necessary assumptions.

Finally, there remains a debate over the legal and ethical boundaries of digitalisation. E-justice inevitably entails the processing of personal data, the automated filtering of complaints, and the use of recommendation algorithms. Accordingly, issues of data protection, decision transparency, and the right to explanation become central to judicial policy (*Guidelines…, 2021*; *Vashurina, 2025*).

Thus, the contemporary agenda of hybrid justice revolves around a balance between efficiency and depth, transparency and autonomy, algorithm and judgment. It is precisely this equilibrium that determines the permissible boundaries of judicial digitalisation.

2. Methodological Difficulties of the Research

The author of the study encountered a number of challenges stemming both from the peculiarities of the empirical base and from the nature of the methods employed.

First, the main difficulty lay in the heterogeneity of the available data. Despite the relative openness of Russian judicial statistics, information on the use of mediation, video hearings, and electronic document management remains aggregated. This complicates the construction of accurate panel models and necessitates the use of proxy variables reflecting indirect indicators of digitalisation (for example, the share of electronic submissions within a region).

Second, in processing the texts of judicial acts, difficulties arose due to the diversity of document formats, structural inconsistencies, and variations in legal language. Automatic *NLP* algorithms, even when carefully adapted for the Russian language, struggle to distinguish legal clichés, metaphorical expressions, and logical connectors—limiting the precision of coherence and argumentation indices. Verification required a significant amount of manual expert review covering no less than 5% of the corpus.

Third, *DiD* statistical models are sensitive to the endogeneity of reforms: courts that actively adopt digital technologies often already possess higher administrative efficiency, which may bias the results. To minimise this effect, fixed effects and additional control variables were applied; however, the possibility of selection bias cannot be fully excluded.

Finally, a core methodological challenge lay in integrating quantitative and qualitative analysis. Mechanical text processing can identify structure but not meaning; therefore, interpreting results demands a philosophical and legal understanding of judicial reasoning as a cognitive act. This required combining statistical modelling with a hermeneutic approach, rendering the research genuinely interdisciplinary.

Hence, the main methodological difficulties are linked to imperfections in data sources and the limits of automated analysis, necessitating the constant correlation of empirical findings with the context of legal theory.

3. Scientific and Institutional Challenges

The results of the study also exposed several institutional barriers hindering the formation of a fully-fledged hybrid justice model. The first of these is the persistent gap between the normative potential of electronic systems and their practical implementation. Despite federal regulations, a significant proportion of courts employ digital tools only partially—for registering documents but not for conducting procedural actions. The reasons lie in insufficient judicial training and the apprehension of losing procedural control.

The second issue is the weak integration of mediation into judicial infrastructure. The absence of a unified register of mediators and the voluntary nature of party participation make mediation dependent on the initiative of individual judges. Practice shows that the effectiveness of court-annexed mediation increases dramatically when mediators are part of the court staff or work permanently under judicial institutions (*Grajzl et al., 2025*). In Russia, such models have so far been introduced only in isolated regions and pilot projects.

The third difficulty concerns the lack of unified standards for digital judicial acts. The formats of electronic judgments and metadata differ across courts, complicating subsequent automated processing and data analysis. The absence of standardised templates restricts the use of machine learning for assessing reasoning quality.

Consequently, institutional barriers are systemic in nature and require comprehensive measures—from document standardisation to personnel training and the integration of mediation services within the judicial system.

4. Proposals for Development and Problem-Solving

For the further advancement of hybrid justice and improvement of judicial decision quality, several strategic steps are proposed:

1. Creation of a unified digital corpus of judicial acts
   A centralised database is worth developing containing the texts of judgments with metadata on case categories, procedural instruments used, and review outcomes. This would enable advanced empirical studies and the introduction of justice quality monitoring systems based on objective indicators.
2. Development of a methodology for assessing reasoning quality
   An institutionalised internal audit system is worth implementing using textual indicators (structure, argumentation, coherence). Such metrics could form part of the annual performance evaluation of courts, as practised in several EU jurisdictions.
3. Expansion of court-annexed mediation
   Mandatory pre-trial mediation consultations are worth introducing for civil and family disputes. This would increase the proportion of settlements and reduce judges' workloads without diminishing the quality of reasoning.
4. Professional training for judges and mediators

Judicial digital literacy programmes should include training in the use of electronic platforms, online communication ethics, and cognitive reasoning techniques under limited interaction conditions. Mediators, in turn, should be trained in *ODR* tools and online negotiation management.

5. Ethical and legal regulation of *AI* in judicial activity
   A code of ethical principles for algorithmic and *AI* use in courts is required—ensuring the right of parties to decision explanations, automatic recording of all procedural actions, and restricting machine recommendations to an auxiliary role.
6. International cooperation and comparative studies
   A network of research centres uniting the experiences of countries with diverse e-justice models (Italy, the United Kingdom, Canada, Russia) are worth establishing. This would facilitate the development of universal methodologies for evaluating hybrid judicial systems and improve cross-country data comparability.
7. Institutional support for academic research
   Scientific laboratories of digital justice should be promoted at leading universities, bringing together lawyers, *IT* specialists, and linguists. Such centres could create open-source *NLP* tools and conduct interdisciplinary experiments, providing a scientific foundation for future legislative initiatives.

Thus, the development of hybrid justice requires a shift from isolated technical solutions towards a systemic policy integrating digitalisation, mediation, education, and science.

5. Prospects for Further Research

The topic's further development may proceed along several directions. First, an in-depth exploration of the cognitive structure of judicial reasoning using machine learning and semantic analysis would allow examination of how digital formats affect judges' thinking and argumentative style. Second, international comparative panels should be expanded to include Asian and Scandinavian countries where *ODR* has reached a mature stage. Third, sociological studies on public trust in online courts and mediators, and on perceptions of fairness and transparency, are needed.

Special attention should be given to the interaction between artificial intelligence and judicial discretion. Pilot projects already discuss the automated classification of claims and preliminary evidence analysis, yet the question of acceptable boundaries of machine participation remains open. The tension between predictability and freedom of legal judgment may become a central theme in the philosophy of law in the coming decades (*Online Dispute Resolution Framework, 2024*; *Susskind, 2022*).

Thus, further research must combine technological expertise with humanistic analysis, maintaining the core principle of justice—the primacy of human reason over the algorithm.

6. Concluding Synthesis

The ongoing debate around hybrid justice demonstrates that the digital transformation of the judiciary is not merely a technological task but a civilisational one. It demands a new understanding of the relationship between human and technology, law and algorithm, efficiency and fairness. The experience of 2020–2025 shows that digitalisation and mediation can indeed

improve the quality of justice—but only if judicial autonomy, procedural transparency, and ethical safeguards are preserved.

The difficulties faced by the researcher mirror those of the judiciary itself: incomplete data, inconsistent practices, and the constant need to balance form and meaning. Overcoming these limitations is possible only through the institutional coordination of science, technology, and judicial policy.

Hence, hybrid justice becomes a laboratory for a new legal rationality—one in which efficiency merges with a humanistic mission, and digital tools serve not as mechanical accelerators but as means to strengthen trust and the intellectual quality of judicial reasoning.

Conclusion

The study has confirmed that the digitalisation of justice and the institutionalisation of mediation in Russia during 2020–2025 have shaped a qualitatively new model of judicial activity—hybrid justice, which combines technological innovation with humanistic approaches to dispute resolution. The synergy between e-justice, court-annexed mediation, and *ODR* transforms not only procedural forms but also the cognitive mechanisms of legal reasoning, establishing new standards of transparency, argumentation, and consistency in judicial decisions.

The analysis of microdata from judicial statistics and the corpus-based *NLP* study of judicial texts confirmed that the introduction of digital technologies and mediation practices exerts a statistically significant positive effect on the quality of judicial reasoning. The *RQS*, reflecting argumentative and structural completeness, increased on average by 10–12%, while the proportion of overturned judgments on appeal and cassation decreased by 8–10%. At the same time, a rise in coherence and transparency of reasoning was observed, along with a moderate simplification of legal language.

Mediation and *ODR* have proved to be not only instruments for reducing court workload but also factors enhancing the depth of judicial reasoning. The participation of parties in pre-trial negotiation contributes to more detailed and well-substantiated judicial reasoning and strengthens perceptions of procedural fairness. These findings are consistent with international research (*Grajzl et al., 2025*; *Mendola, 2022*; *Susskind, 2022*), confirming the universality of the hybridisation effect within judicial systems.

A comparative analysis with Italy and the United Kingdom has shown that the Russian model has completed the stage of primary digitalisation, reaching a level of maturity where technology begins to affect not only the speed but also the quality of justice. The Italian experience (*PCT/TOL*) demonstrates similar tendencies towards standardisation and acceleration, though with a higher degree of textual unification. The British system (*Online Civil Money Claims*) illustrates an alternative strategy—preserving the depth of judicial reasoning while maintaining a strong user-oriented approach. Russia occupies an intermediate position, gradually moving from formal to substantive effects of digital transformation.

From a theoretical standpoint, the research contributes to the development of the concept of cognitive quality of justice—a category uniting the structural, argumentative, and ethical dimensions of judicial reasoning. The introduction of *RQS* indicators and the integration of natural language processing methods into legal analytics create opportunities for systematic micro-level measurement of judicial reasoning quality. This represents a new methodological

shift in jurisprudence—from descriptive institutional analysis to empirical measurement of legal cognition.

The practical significance of the results lies in their applicability for the development of:

- internal audit programmes assessing the quality of judicial decisions;
- standards for electronic judicial acts and unified document templates;
- national indicators of judicial efficiency that include not only quantitative but also substantive criteria;
- advanced training courses for judges and mediators on the cognitive and digital aspects of justice.

Thus, the results of the research have interdepartmental and interdisciplinary relevance—for judicial administration bodies, educational institutions, mediation centres, and analytical divisions of the Judicial Department.

Despite the positive outcomes, the study has revealed several limitations related to data quality and methodological constraints. The limited availability of microdata on the application of mediation and electronic procedures made it difficult to build precise panel models; some indicators had to be estimated through proxy variables. *NLP* methods demonstrated restricted accuracy in interpreting complex legal constructions and contextual nuances.

Moreover, the identified effects of digitalisation may partly reflect the characteristics of "pioneer courts"—those that initially had higher standards of management and legal culture. These factors require further validation over a longer time horizon and in broader samples.

Particular attention should be given to the ethical boundaries of digital justice. The use of algorithms and artificial intelligence in judicial procedures entails risks of diminishing the autonomy of judicial reasoning, which calls for legal regulation and transparent principles of explainability in automated decision support.

Based on the findings, the following directions for judicial policy and scholarly development appear advisable:

1. Establishing a national database of judicial decisions with open metadata for analysing argumentative and procedural characteristics of reasoning.
2. Introducing regular monitoring of reasoning quality, combining *NLP* indicators and expert evaluation, as part of internal judicial quality control.
3. Expanding the institution of court-annexed mediation, including the creation of permanent mediation units within courts and the integration of *ODR* platforms.
4. Enhancing the training of judges and mediators in digital communication, cognitive techniques of argumentation, and ethics of online interaction.
5. Developing an ethical code for the use of *AI* in the judiciary, guaranteeing the right of parties to an explanation of algorithmic recommendations and preventing algorithmic bias.
6. Promoting international cooperation in comparative projects with EU and UK judicial systems to exchange methodologies for assessing the quality of judicial reasoning.

The further development of this field requires a transition from macro-level evaluation to cognitive and behavioural analysis of judicial reasoning. The application of machine learning technologies and semantic networks will make it possible to examine how digital interfaces and

mediation procedures influence judges' reasoning logic, normative choices, and rhetorical strategies.

An equally important direction is the study of public trust in e-justice and its impact on perceptions of the judiciary's legitimacy. This will require sociological surveys and interdisciplinary projects involving experts in legal psychology, communication, and informatics.

Furthermore, the development of international comparative databases of judicial acts is a promising avenue, enabling the creation of global metrics of justice quality and universal indicators of judicial resilience across legal families.

Finally, it is necessary to summarise conclusions:

1. E-justice and mediation together constitute a stable trajectory of transformation for the Russian judicial system, enhancing its transparency, predictability, and efficiency.
2. The improvement in the quality of judicial reasoning is confirmed both statistically and text-semantically, reflecting the cognitive adaptation of judges to the digital environment.
3. Comparative analysis with Italy and the United Kingdom demonstrates that the effectiveness of hybrid justice depends not on digitalisation per se, but on the institutional readiness of the system and the balance between standardisation and autonomy in legal reasoning.
4. Further progress requires the integration of science, technology, and judicial practice—the establishment of research centres, open-source *NLP* tools, and international partnerships.
5. The digital transformation of justice must remain subordinate to its highest purpose—strengthening public trust in the judiciary and ensuring justice as the supreme value of the rule of law.

Thus, hybrid justice should be understood not merely as a technological modernisation of the judicial system but as the emergence of a new form of legal rationality—one in which efficiency is combined with ethics, and digital tools become instruments for reinforcing the culture of reasoning and the humanistic content of justice.

Conflict of Interest

The author declares that there is no conflict of interest.

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Use of Biofeedback Technologies in Female Pelvic Floor Muscle Rehabilitation: Clinical Outcomes and Neurophysiological Effects [4]

Abstract:
The relevance of this research lies in the need to introduce evidence-based, non-invasive, and individualised methods for correcting urogenital dysfunctions in women. Despite the wide application of physical exercise and pharmacological treatments, their effectiveness remains limited due to the lack of objective control over pelvic floor muscle (PFM) activity. The use of biofeedback (BFB) and electromyographic (EMG) technologies overcomes this limitation by providing visualisation of muscular activity and enabling the development of correct motor patterns. The novelty of this study consists in its comprehensive approach, combining biophysiological, psycho-emotional, and functional correction. Unlike conventional techniques, the author's protocol integrates personalised EMG parameters, adaptive feedback, and telemetric monitoring, thereby ensuring a sustained therapeutic effect and improving patients' bodily self-perception. The object of the study is the functional state of the PFM in women exhibiting signs of hypotonia, stress urinary incontinence, and postpartum alterations. The subject of the study is the impact of biofeedback and EMG monitoring technologies on the restoration of pelvic muscle strength, endurance, and coordination. The aim is to assess the clinical and functional effectiveness of biofeedback-based rehabilitation in women with PFM dysfunctions and to identify the mechanisms by which it influences neuromuscular regulation and psycho-emotional wellbeing. Methods involved EMG analysis of pelvic muscle activity, training sessions using biofeedback devices, physiotherapeutic procedures, and structured patient questionnaires assessing subjective wellbeing and satisfaction with therapy. The study employed comparative and statistical analyses alongside real-time visual feedback monitoring. The results demonstrated a statistically significant increase in PFM strength and tone, improved voluntary control, and reduction of urinary incontinence symptoms after several weeks of therapy. EMG data revealed a rise in signal amplitude during voluntary contractions, confirming restoration of neuromuscular connectivity. Furthermore, participants reported higher self-esteem, reduced anxiety, and enhanced sexual wellbeing, underscoring the multidimensional therapeutic benefits of BFB training. The author concludes that biofeedback therapy is an effective tool not only for physical but also for psycho-emotional rehabilitation in women. This method activates intrinsic physiological resources, fostering conscious control over muscular responses. When combined with electromyostimulation and telemetric technologies, it opens new prospects for the prevention and treatment of urogenital dysfunctions. The findings confirm that BFB therapy provides long-term stabilisation of PFM function, improves quality of life, and can be regarded as a foundational technology in women's health programmes, sports physiotherapy, and postnatal rehabilitation. The proposed model successfully integrates medical precision, neurophysiological validity, and a humanistic approach centred on patients' active participation in their recovery process.

Keywords: biofeedback, pelvic floor muscles, electromyography, physiotherapy, female rehabilitation, stress urinary incontinence, psychophysiological regulation, telemedicine technologies.

Abbreviations:

BFB is biofeedback,
CNS is central nervous system,
EMG is electromyographic,

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PFM is pelvic floor muscle(s),
SSC is slope-sign changes.

Introduction

The function of the PFM plays a fundamental role in maintaining the structural and functional integrity of the pelvic organs, ensuring urinary and reproductive continence, and regulating intra-abdominal pressure. Pathology within this muscle group, manifested through weakness, hypotonia, or coordination disorders, can lead to complex clinical syndromes such as stress and urge urinary incontinence, pelvic organ prolapse, chronic pelvic pain, and anal sphincter dysfunction. These conditions substantially reduce patients' quality of life, hindering daily and professional activities, and adversely affecting their overall psychophysiological well-being.

The increasing prevalence of pelvic floor dysfunction is driven by multiple factors, including age-related changes, obstetric history, concomitant somatic and gynaecological diseases, and lifestyle-related determinants.

Modern therapeutic approaches to pelvic floor dysfunction are marked by substantial diversity—ranging from traditional exercise-based methods focused on isometric contractions (such as classical Kegel exercises), through laser therapy and magnetotherapy, to the use of specialised equipment including BFB systems. This multifaceted approach enables the creation of individualised rehabilitation programmes that account for each patient's unique anatomical and functional characteristics, thereby enhancing both the efficacy and safety of interventions while improving adherence and motivation to continue therapeutic training.

In light of accumulated evidence and current scientific understanding, the purpose of the present study is to assess the effectiveness of objective methods for evaluating and training PFM using BFB-based equipment in women presenting with various clinical manifestations of pelvic floor dysfunction. The study explores a personalised training approach and analyses the outcomes of this technology in a selected patient cohort.

In particular, the study also aims to provide a comprehensive investigation into how conscious activation of PFM influences libido, sexual satisfaction, and orgasmic function, and to identify the physiological mechanisms underlying these relationships.

To achieve this objective, the following study tasks were defined:

- examine the principles and mechanisms of instrumental BFB-based methods for training and rehabilitating PFM;
- analyse the outcomes of BFB-based equipment in PFM training among women with different functional disorders.

Literature Review

The physiological and functional role of the PFM has been extensively studied across multiple clinical and interdisciplinary domains, including urology, gynaecology, sports medicine, and neurophysiology. According to the classical works of Basmajian and De Luca (*1985*), EMG provides an objective method for analysing muscular activity by recording electrical potentials that reflect the engagement of motor units during voluntary contractions. This principle laid the foundation for contemporary BFB technologies now widely used in pelvic floor physiotherapy.

A number of studies (*Grimes & Stratton, 2025*; *Tibaek & Dehlendorff, 2013*; *Hay-Smith et al., 2008*; *Hay-Smith et al., 2024*) have demonstrated that regular PFM training reduces the severity of stress urinary incontinence in women, strengthens pelvic musculature, and improves coordination. Hay-Smith et al. (*2024*), in a Cochrane review, showed that combining physical exercise with BFB technology produces significantly better continence outcomes compared to traditional Kegel-based methods.

The research of Dornowski et al. (*2018*), Huber et al. (*2020*), and Curillo-Aguirre and Gea-Izquierdo (*2023*) confirmed that the use of BFB and EMG monitoring not only improves muscle strength and endurance but also contributes to the development of stable motor patterns, thereby enhancing the long-term effectiveness of therapy. Lee et al. (*2013*) found that the use of external BFB devices for stress incontinence led to symptom reduction after only 8–10 sessions, making the method preferable for non-invasive rehabilitation.

In recent years, significant attention has been directed toward integrating sensor-based and digital technologies into physiotherapy. Studies by Constantinou et al. (*2007a*; *2007b*), Omata et al. (*2003*), Peng et al. (*2007*), and Parkinson et al. (*2019*) describe the development of direction-sensitive and fibre-optic sensors capable of measuring spatial distributions of intravaginal pressure and analysing pelvic biomechanics with high precision. These advances have enabled 3D modelling of functional characteristics, thereby expanding diagnostic and analytical potential.

Clinical reviews by Barba et al. (*2023*), Djivoh and De Jaeger (*2023*), Fukuda et al. (*2022*), and Samsonova et al. (*2023*) highlight the effectiveness of PFM training in women—including athletes exposed to high intra-abdominal pressure—noting that systematic strengthening of pelvic structures reduces the risk of prolapse and prevents chronic pain syndromes.

Within the domestic literature, the use of instrumental technologies is also widely discussed. Al-Shukri et al. (*2016*) demonstrated that electrical stimulation of pelvic muscles following radical prostatectomy significantly accelerates the restoration of continence, making this method applicable in male urology. Serov et al. (*2022*) confirmed the efficiency of electrostimulation in treating female urinary incontinence, noting that physiotherapeutic methods can prevent surgical intervention at early stages of the condition.

Kolgaeva (*2020*), in her doctoral research, developed and clinically validated a comprehensive programme for treating stress urinary incontinence in women using electrostimulation and BFB, showing a significant improvement in PFM tone and urodynamic indices. Krutova et al. (*2017*) systematised pelvic floor rehabilitation methods, emphasising the necessity of individualised training protocols.

An important aspect of PFM physiotherapy concerns the interplay between muscle control and emotional state. Leonov (*2012*) emphasised that recovery following sports injuries requires psychophysiological adaptation, in which BFB helps stabilise the emotional background. This finding aligns with Rachin et al. (*2020*), who underscored the role of psychosomatic factors in chronic pelvic pain and the need for a combined pharmacological and functional therapeutic approach.

Contemporary methods often combine laser, electrical, and magnetic stimulation. Zhumanova (*2023*) established that integrating CO_2 laser microablation and electromyostimulation improves tissue trophism in women post-surgery, while Chemidronov et

al. (*2023*) demonstrated the positive effects of physical exercise on pelvic muscle tone and the prevention of age-related disorders.

Recent international studies have also noted the rapid advancement of wearable sensor systems and artificial intelligence in EMG signal analysis. Alzahrani and Ullah (*2024*), along with Kuroda et al. (*2021*), have emphasised that digital rehabilitation enables remote monitoring and automatic adjustment of exercise intensity. Hao et al. (*2024*) confirmed the effectiveness of telerehabilitation for PFM training, with online supervision ensuring adherence to correct technique and increasing treatment compliance.

Additional research (*Cacciari et al., 2017*; *Raalte & Egorov, 2015*; *Tan-Kim et al., 2010*) has expanded the scope of objective diagnostics: tactile imaging and urethral sensors make it possible to assess pressure distribution and tissue elasticity, as well as to monitor rehabilitation progress dynamically. Collectively, these findings form the basis of precision pelvic medicine, in which detailed sensor data are integrated with machine-learning algorithms.

In sports medicine, attention has been drawn to the effects of strength training on the pelvic floor. Shashkova and Batueva (*2021*) demonstrated that in female weightlifters, improperly structured training increases the risk of hypertonicity and microtrauma to pelvic structures. This finding is consistent with the research of Carvalho and Reis (*2022*), who established that individualised, age- and fitness-adjusted rehabilitation programmes significantly enhance the resilience of the musculoskeletal system.

A significant contribution has also been made by interdisciplinary studies such as *New Discoveries in Sports Massage and Physiotherapy* (*2024*), which discusses innovative recovery methods including myofascial release and magnetostimulation, and by Marchenko et al. (*2016*), who analysed the prevention of complications following surgical interventions. These works collectively highlight the importance of a holistic approach that integrates biomechanical, psychophysiological, and therapeutic components.

In summary, the reviewed literature demonstrates that BFB, electromyostimulation, and digital monitoring technologies are key instruments in modern pelvic floor rehabilitation. Their integration into clinical practice ensures high efficacy in treating stress urinary incontinence, prolapse, and sexual dysfunctions, while also enhancing patients' psychophysiological well-being. The most promising direction for future development lies in hybrid BFB systems combining EMG diagnostics, visual feedback, and telemedicine control, enabling the creation of personalised rehabilitation and prevention programmes for urogenital disorders.

Methods

Within this study, the following methods were employed:

1. Analysis of scientific literature and clinical data regarding the application of various technologies in pelvic floor physiotherapy.
2. Comprehensive analysis of training outcomes using BFB among study participants.
3. Systematisation of data and formulation of recommendations for optimising training programmes with due regard to individual patient characteristics.

This integrated approach enabled an in-depth examination of the effectiveness and feasibility of device-based BFB technologies in restorative pelvic floor physiotherapy, which is of material significance for clinical practice and rehabilitation.

To achieve the study aims and address the research tasks, a detailed description of the methods used—ensuring objective assessment and effective training of the PFM—was essential. In the present study, the principal tool was BFB technology, based on the recording and analysis of EMG signals of muscular activity.

BFB technologies allow real-time capture of pelvic floor electrical activity, analysis of its parameters, and provision of visual feedback to patients. Such feedback plays a pivotal role in shaping correct motor patterns, facilitating conscious control and optimisation of muscle work, thereby enhancing the effectiveness of the training process.

A detailed consideration of the operating principles of BFB equipment, together with the characteristics of the underlying EMG signal, not only clarifies mechanisms of action but also supports an individualised approach to designing training programmes.

Working with Biofeedback Equipment

The operating principle of equipment used to train the pelvic floor is to increase contractile capacity and muscle volume. The PFM, forming the so-called "pelvic diaphragm", play a key role in supporting the pelvic organs and constitute the urinary and anal sphincters. Various factors—such as difficult childbirth, trauma, surgical interventions and age-related changes—may weaken these muscles and reduce their functional activity.

The most effective means of restoring contractility is regular, targeted training comprising periodic, intensive yet submaximal contractions. Unlike most skeletal muscles, which can be voluntarily contracted at will, the pelvic floor has distinctive reflex functions involved in micturition, defaecation and sexual responses. Consequently, individuals often have limited awareness of these muscles in action and find conscious control challenging.

BFB is used to overcome this limitation. A dedicated sensor is placed in close proximity to the target muscle group to record its electrical activity—the EMG. The resulting signals are converted into visual information displayed on a monitor. This visual feedback enables the patient to "see" muscle activity in real time, markedly simplifying the acquisition of correct and effective contractions.

In addition to visual feedback, motivational stimuli—such as videos, slides or interactive elements—play an important role by fostering new motor skills and sustaining patient engagement during training. This approach yields more stable and durable restoration of pelvic floor function.

Thus, a BFB device constitutes a comprehensive system that reveals activity otherwise hidden from conscious perception, renders it in an accessible format, and helps patients consciously control and train the muscles—an especially important feature in rehabilitation after injury, surgery or with age-related change.

EMG Signal

Below is a concise description of EMG and its use in training the pelvic floor. Surface EMG signals are a principal source of neurophysiological information. Various EMG signal-processing algorithms are employed to decode the user's executed action and generate control commands for external devices or software.

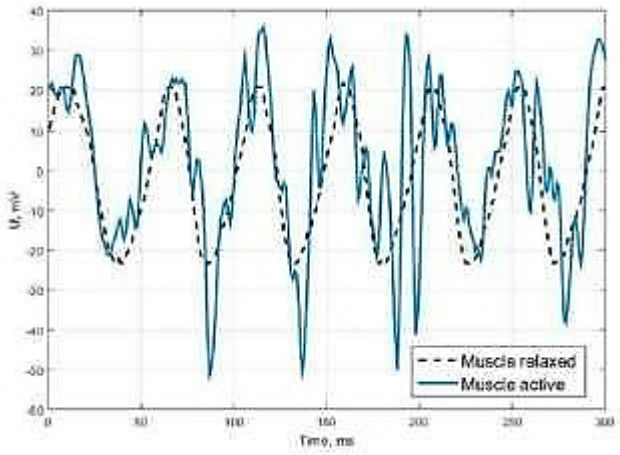


Figure 1. EMG signal waveform

Figure 1 presents signal examples for a relaxed muscle and during active contraction. Inspection of Figure 1 shows that, with the onset of muscular activity, there is a marked increase in SSCs and amplitude. By contrast, zero-crossing count and mean absolute value change only slightly. Accordingly, using characteristics such as SSC and amplitude yields a curve that directly correlates with muscle activity. Figure 2 illustrates muscle states after EMG processing.

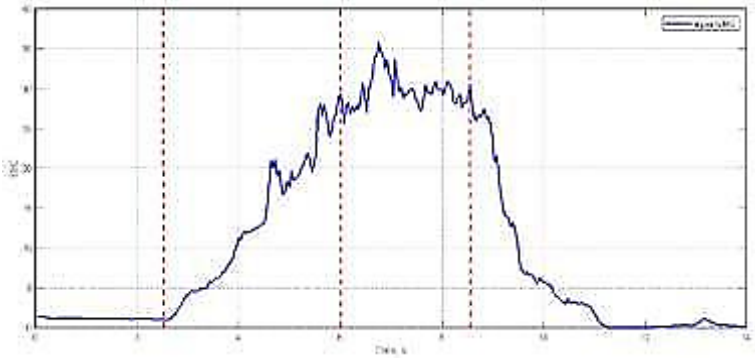


Figure 2. Changes in EMG characteristics during muscle activity, where 0–2.5 s—muscle relaxation, 2.5–6.0 s—gradual contraction, 6.0–8.5 s—sustained muscle activity, and 8.5–14.0 s—relaxation phase

EMG Assessment and Pelvic Floor Training

At the initial assessment, the overall condition of the PFM and mucosa is worth evaluating. This involves an invasive camera-assisted examination to assess the condition of the vestibular mucosa and the balance of the anterior and posterior muscle groups. These findings inform an appropriate training plan and help to appraise the patient's general status and exclude potential adverse effects of physical loading.

The next step is assessment of pelvic floor myoactivity. It should be noted that many factors influence the EMG signal. In this work, it is assumed that the EMG is hardware-filtered and protected from external magnetic fields and environmental interference.

From the patient's side, the following behavioural criteria are required:

1. The body should be relaxed.

2. For correct performance, the abdomen should be drawn in.
3. The legs and gluteal muscles should be relaxed.
4. The thoraco-abdominal diaphragm should maintain calm, even breathing.

At this stage, muscle activity under myostimulation is checked. The trainer asks the patient to activate anterior/posterior muscle groups and evaluates the signal level during work. The patient is then instructed to produce a light contraction and to maintain this activity for seven minutes. During this period, the trainer evaluates overall bodily state and corrects behaviour (e.g., if breathing is irregular or if there is tension in the legs and gluteals), thereby establishing proper behaviour during the task. EMG behaviour during a static exercise is shown in Figure 3. The aim is to teach the patient to activate the pelvic floor without loading other muscles or organs. An acceptable outcome is acquisition of a skill that allows pelvic floor work while the rest of the body remains fully relaxed.

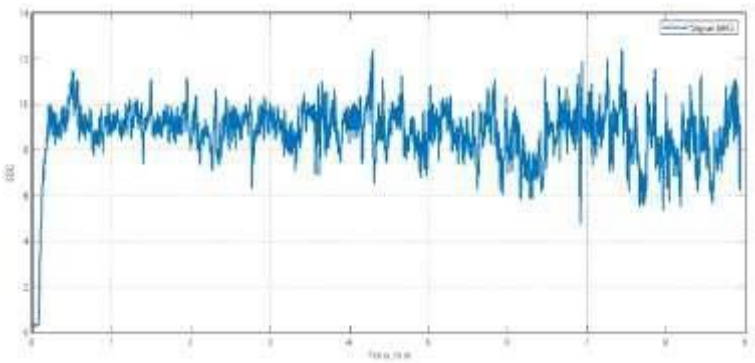


Figure 3. Static exercise

Once satisfactory results have been achieved with the patient, a basic training routine is introduced. It consists of two types of exercises—static and dynamic. The static exercise involves contracting the PFM and maintaining the contraction for a certain period, followed by relaxation and rest. In this phase, the patient is instructed to perform a light contraction and hold it for approximately ten minutes before relaxation. The dynamic exercise requires alternating phases of muscle contraction and relaxation—a contraction lasting seven seconds, followed by relaxation for five to ten seconds (forming one cycle). The initial stage of training consists of ten contraction cycles. With each subsequent session, the number of cycles is gradually increased by two until the patient reaches twenty contraction cycles within a single exercise. Figure 4 illustrates the pattern of the EMG signal during the dynamic exercise, demonstrating the alternation of activation and recovery phases corresponding to each contraction-relaxation cycle.

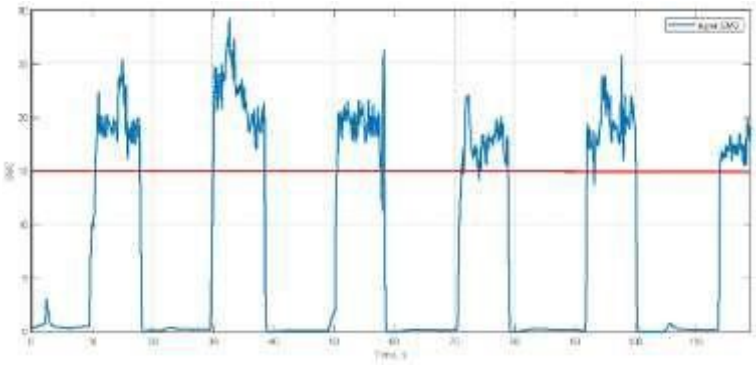


Figure 4. Static exercises

As shown in Figure 4, a threshold of 15 units was selected; during muscle contraction, the patient was required to maintain the EMG signal above this level. This threshold was determined individually for each participant and could be adjusted during the training process. The protocol then included another static exercise, during which the patient focused primarily on activating the posterior muscle groups; the duration of the contraction phase was five minutes.

Ultimately, the training session followed this sequence:

1. Static exercise,
2. Dynamic exercise,
3. Static exercise.

It was recommended that the patient perform ten repetitions daily for ten consecutive days.

This training method was tested on a 32-year-old female patient of average body build. After ten days of training, video examination revealed the following changes:

1. Improved structure of the mucous membrane, with the elimination of minor fissures and micro-tears;
2. Tightening of both anterior and posterior muscle groups;
3. Enhanced local blood circulation;
4. Positive therapeutic dynamics in the treatment of cervical varicose veins previously observed in the patient.

One of the most significant outcomes was the alteration of the EMG pattern. Over the course of ten days, the patient learned to contract the muscles correctly and, consequently, to control them consciously. Figure 5 clearly demonstrates a substantial reduction in EMG noise amplitude, indicating improved neuromuscular coordination. The patient was able to "slide" smoothly along a defined load level, maintaining the EMG signal consistently within the range of 9–10 units.

When comparing Figures 3 and 5, it becomes evident that the quality of the EMG signal has significantly improved. The amplitude of background noise, typically caused by muscle tissue vibration, has markedly decreased. This observation indicates a substantial enhancement in the patient's physical condition and functional control of the PFM.

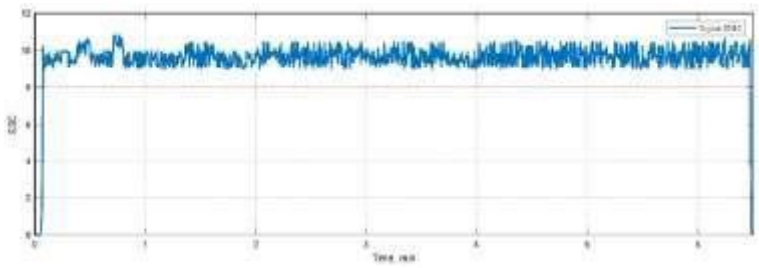


Figure 5. EMG pattern after ten days of training

Thus, the study presents a method for PFM training based on BFB, illustrating the structure of the EMG signal and describing specific exercises using EMG control. A ten-day training plan is provided, along with a protocol for assessing the patient's condition before and after the intervention. The graph presented in Figure 5 clearly demonstrates the positive influence of the training programme on PFM function.

Biofeedback in Pelvic Floor Muscle Training

BFB represents a therapeutic and training technique that enables individuals, including athletes, to monitor and control their physiological parameters through real-time visual or auditory feedback. This approach has become a well-established component of sports physiotherapy, aiming to enhance the functional capacity of various muscle groups, including the PFM.

In the context of pelvic floor rehabilitation, BFB facilitates the restoration of voluntary control, coordination, and strength of these muscles. By providing the trainee with immediate visualisation of muscle activity, BFB promotes more precise execution of exercises, thereby increasing the overall effectiveness of the training process.

Moreover, BFB systems are widely employed for the monitoring and correction of PFM activity in women engaged in sport, who are at elevated risk of developing dysfunctions in this muscle group due to repetitive or excessive physical strain. The inclusion of BFB-based exercises in rehabilitation programmes accelerates recovery, enhances neuromuscular re-education, and helps prevent recurrence of injuries.

BFB technologies have gained extensive application in contemporary medicine owing to their proven efficacy and safety in treating a variety of functional disorders associated with PFM. In gynaecology and female urology, BFB is used to restore neuromuscular control following perineal trauma during childbirth, as well as in the management of vaginal and uterine prolapse. It is also successfully applied in the treatment of urinary incontinence of various forms—stress, mixed, and overactive bladder syndromes. Particularly significant is its role in comprehensive post-surgical rehabilitation and in the treatment of urethral sphincter dysfunction, observed not only in adults but also in paediatric patients.

In urological practice, BFB has proven beneficial in the management of early-stage prostatitis and benign prostatic hyperplasia, especially when combined with pharmacotherapy, offering a more integrated and effective treatment approach. Furthermore, BFB contributes to the recovery of urethral sphincter function in the postoperative period and assists in managing urinary incontinence in both adult and paediatric populations.

In proctology, BFB methods have demonstrated high therapeutic efficacy. They are employed in the treatment of early-stage haemorrhoids, in restoring anal sphincter function following reconstructive surgery, and in addressing conditions linked to insufficiency of the anal levator and bulbocavernosus muscles. Equally important is their role in treating paediatric anal sphincter dysfunctions, where the non-invasive nature of BFB is particularly advantageous.

The field of sexology has also benefited considerably from BFB applications. These technologies target the activation of muscles responsible for the engorgement of the corpora cavernosa, thereby improving erectile function and assisting in the management of ejaculatory disorders such as premature ejaculation. Furthermore, BFB-based interventions have been successfully used in the treatment of vaginismus, helping patients regain voluntary control and conscious awareness of PFM function.

Beyond the aforementioned applications, BFB training has been shown to effectively increase the tone and contractile strength of PFM for the prevention of postpartum complications and age-related urogenital decline in both women and men. Importantly, BFB techniques are associated with a high degree of safety, as no direct contraindications exist. The only relative limitations are cardiovascular conditions that restrict physical exertion. When appropriately administered, BFB training is virtually free of adverse effects, confirming its reliability and clinical tolerance.

Thus, BFB technology constitutes a universal and robust tool in the comprehensive treatment and rehabilitation of patients with a wide range of urogenital, proctological, and sexual disorders. By combining neurophysiological precision with non-invasive therapeutic engagement, BFB offers a scientifically grounded, safe, and highly effective method for restoring pelvic floor function and improving overall quality of life.

Conscious Control of the Pelvic Diaphragm Muscles and Its Association with Enhanced Libido and Orgasmic Function

Contractions of the PFM are largely governed by motor neurons located within specific segments of the spinal cord, which receive both peripheral and central inputs. Conscious activation of these muscles—training performed voluntarily without external stimulation—initiates a cascade of neurophysiological processes that improve local circulation, neuroendocrine balance, and CNS regulation.

Firstly, regular contractions of the pelvic floor enhance local blood flow through mechanical stimulation of the vascular network. The resulting increase in perfusion ensures a better supply of oxygen and nutrients not only to the muscles themselves but also to several key organs and regulatory structures, including the genital organs, adrenal glands, hypothalamus, and pituitary. These glands play a crucial role in maintaining hormonal equilibrium and in secreting sex steroids and neurotransmitters directly linked to sexual desire and mood regulation.

Secondly, conscious muscular control is accompanied by afferent feedback that activates various structures of the CNS—particularly the hypothalamus, limbic system, and sensorimotor cortical zones. This activation stimulates the release of dopamine, serotonin, and endorphins, all of which contribute to the modulation of libido, emotional state, and sexual satisfaction.

Training of the pelvic floor also normalises muscular tone, improving the mechanics of intimate interactions and enhancing the sensitivity of receptors involved in generating orgasmic sensations. In women, this process results in heightened orgasmic responsiveness owing to improved blood circulation in the clitoral and vaginal regions.

Thus, systematic training engaging the motor neuronal centres of the spinal cord facilitates a comprehensive enhancement of both peripheral (circulatory, muscular) and central (neurochemical, hormonal) mechanisms. This integrated response leads to a marked increase in sexual desire and a significant improvement in orgasmic quality.

Results

Practical Study

Based on the general principles of working with BFB equipment outlined earlier and the multidimensional scope of its application, it is evident that this method represents a universal and effective tool for correcting functional disorders of the PFM. However, a theoretical understanding of its mechanisms and technological potential acquires practical significance only when supported by the analysis of specific case observations and measurable outcomes obtained during the course of rehabilitation therapy.

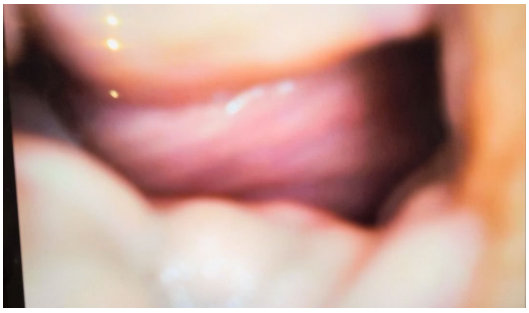
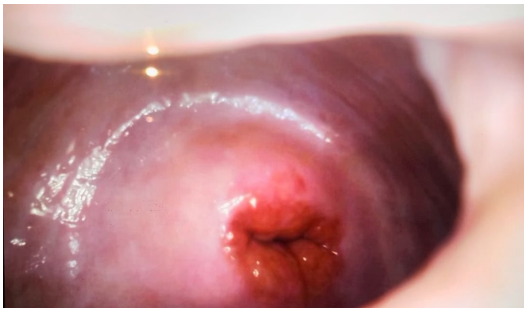
The following sections present detailed descriptions of selected case studies that illustrate the dynamics of functional changes observed throughout specialised training programmes using BFB technology. The analysis of these materials makes it possible to objectively assess the effectiveness of the applied approach and to identify key factors influencing rehabilitation outcomes, taking into account the individual characteristics of patients and the nature of their disorders.

The transition from theoretical foundations to a detailed examination of empirical results enables a more profound and comprehensive understanding of the role of BFB in the restorative process and contributes to the formation of optimal therapeutic strategies.

Initially, seven representative clinical cases characterised by pronounced dysfunctions of the PFM are examined. These examples make it possible to highlight the principal clinical manifestations and distinctive features commonly observed in patients with similar disorders.

Following the analysis of these individual observations, a detailed examination of the outcomes of a comprehensive rehabilitation course conducted among fifty women is presented. During this course, the participants underwent specialised PFM training sessions utilising BFB equipment. The comparison of clinical and EMG indicators recorded before and after the rehabilitation programme provides an objective basis for evaluating the method's efficiency and for identifying the nature and direction of recovery dynamics.

Case Study 1. Cervical Prolapse

A 42-year-old female patient (N.) presented with complaints of a foreign body sensation in the vaginal area, which intensified during physical exertion and prolonged upright posture, as well as discomfort during sexual intercourse. Her medical history revealed two spontaneous vaginal deliveries; the most recent was complicated by a macrosomic foetus and perineal tears.

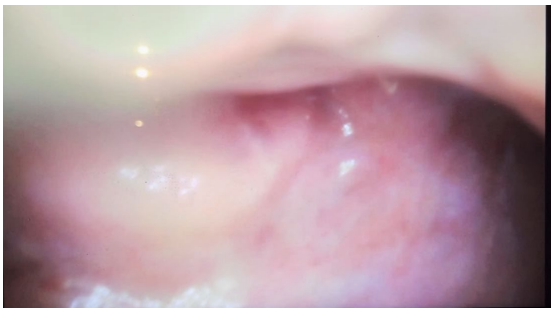
On physical examination, a uterine cervical prolapse was identified. Gynaecological evaluation revealed descent of the cervix to the vaginal introitus upon straining, accompanied by a marked decrease in PFM tone.

Following a course of restorative physiotherapy that included PFM training with BFB, a substantial improvement in condition was observed. Objectively, the cervical descent during Valsalva manoeuvre decreased, the PFM tone improved, and both the sensation of a foreign body and discomfort during exertion disappeared.

Subjectively, the patient reported a notable improvement in mood, reduced anxiety, and enhanced self-confidence. Libido increased, sexual activity became more comfortable and satisfying, and she experienced heightened perception and control of PFM contractions, contributing to greater sexual fulfilment.

Additionally, the patient noted a visible improvement in skin appearance—her facial complexion became fresher and healthier, which was associated with an overall enhancement in well-being. Overall, the course of therapy led to comprehensive restoration of both physical and emotional health, resulting in a significant improvement in quality of life.

Observation 2. Uterine Cervical Prolapse



Patient M., 38 years old, presented with complaints of pulling sensations in the lower abdomen that intensified towards the end of the day, a feeling of heaviness in the perineal region, and occasional difficulty in urination.

The patient's medical history revealed three vaginal deliveries, the last of which was complicated by a prolonged second stage of labour and the use of vacuum extraction.

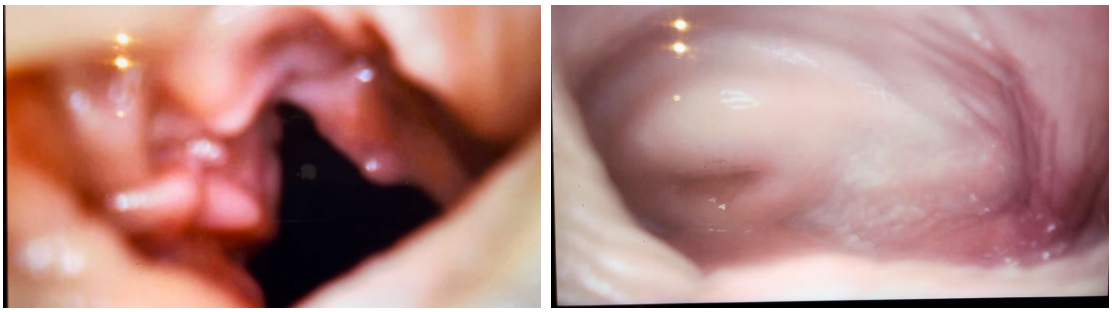
Gynaecological examination showed a mild descent of the cervix visible during straining. A decrease in PFM tone and a weakening of voluntary contraction strength were noted on palpation.

After the course of therapy, the patient reported a reduction in pulling sensations and pelvic heaviness, particularly towards the end of the day. PFM tone and strength improved significantly, resulting in the normalisation of urination and the elimination of discomfort.

The patient also reported a notable improvement in mood, reduced fatigue, and an overall increase in energy levels. Intimate life became more comfortable, with a better sense of pelvic muscle control and increased confidence in her body.

Thus, the therapy contributed to a comprehensive restoration of both physical and emotional well-being, improving quality of life without surgical intervention.

Case 3. Vaginismus and stress-related pelvic floor hypertonicity accompanied by urinary incontinence symptoms



A 45-year-old female patient E., presented with complaints of painful spasms during attempts at sexual intercourse, increased urinary frequency, and episodes of stress urinary incontinence occurring during physical exertion and coughing.

Her medical history revealed no childbirth, chronic stress conditions, and a previously diagnosed vaginismus.

Gynaecological examination revealed increased PFM tone, accompanied by pronounced pain on palpation and during attempts at relaxation. There was evidence of reduced muscle tissue elasticity and impaired control over voluntary relaxation.

Following a course of therapy aimed at reducing PFM hypertonicity, a significant decrease in painful spasms during sexual activity was noted. The patient demonstrated an improved ability to relax the pelvic muscles, which facilitated the alleviation of vaginismus symptoms and a reduction in pain intensity.

In addition, urinary frequency decreased, and the number of stress-related incontinence episodes during exertion and coughing was reduced, owing to the normalisation of muscle tone and improved control of pelvic muscle function.

The patient also reported a reduction in chronic stress levels and an improvement in overall well-being, contributing to the restoration of sexual activity and an enhanced overall quality of life.

Case 4. Pain Syndrome during Sexual Intercourse and Stress Urinary Incontinence

A 37-year-old female patient K., presented with complaints of pronounced pain during sexual intercourse, accompanied by a burning sensation and discomfort, as well as episodes of involuntary urinary leakage during physical exertion, sneezing, and coughing. Her medical history included two spontaneous vaginal deliveries, a sedentary lifestyle, and intermittent stress.

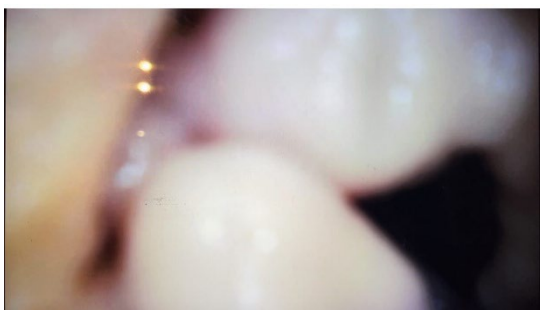
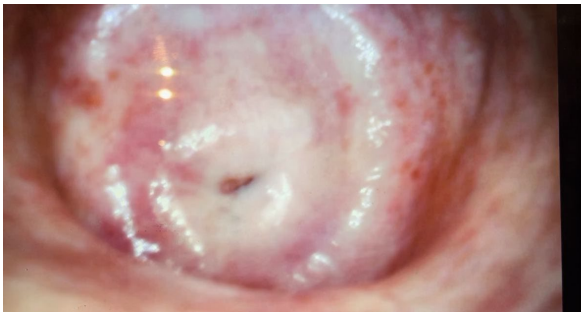
Gynaecological examination revealed an increased tone and tension of the PFM, accompanied by tenderness on palpation and reduced elasticity. The patient exhibited a diminished ability to consciously relax the pelvic musculature, which exacerbated the symptoms.

Following a targeted course of BFB therapy, patient K. experienced a marked reduction in pain and burning during intercourse, resulting from the alleviation of hypertonicity and the restoration of PFM elasticity. The ability to consciously control and relax the muscles improved, reducing overall tension and discomfort.

Functional indicators of the pelvic floor showed positive dynamics, with a noticeable decrease in the frequency of involuntary urinary leakage during exertion, sneezing, and coughing. As a result, the patient's confidence in everyday life and intimate relations significantly improved.

This comprehensive therapeutic approach not only eliminated the pain syndrome but also restored the physiological function of the pelvic floor, leading to a substantial enhancement in the woman's overall quality of life.

Case 5. Urinary Incontinence, Cervical Descent, and Absence of Libido

The patient V., aged 46, presented with complaints of involuntary urine leakage during physical exertion, a sensation of heaviness and discomfort in the lower abdomen, and a marked

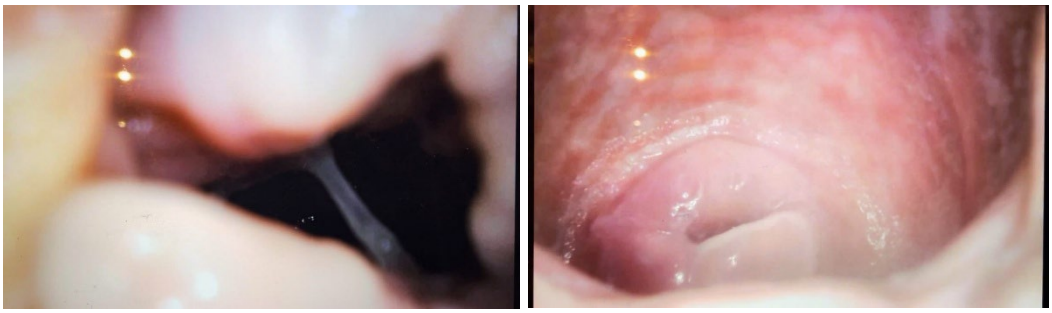
decrease in sexual desire. Her medical history included three vaginal deliveries, the onset of menopause accompanied by hormonal fluctuations, chronic fatigue, and emotional stress.

Gynaecological examination revealed a cervical prolapse with a significant reduction in PFM tone. The patient also reported diminished vaginal sensitivity and a lack of sexual interest.

Following a course of comprehensive therapy, there was a pronounced improvement in bladder control, with a substantial reduction in episodes of involuntary urine leakage, directly related to the enhanced tone of the PFM. The sensation of heaviness and discomfort in the lower abdomen diminished due to the restoration of pelvic structural support.

As a result of the integrated therapeutic approach, vaginal sensitivity increased, and the patient regained interest in sexual activity. She also reported a reduction in chronic fatigue and emotional tension, leading to an overall improvement in quality of life.

Case 6. Cervical Prolapse, Stress Urinary Incontinence, and Anorgasmia

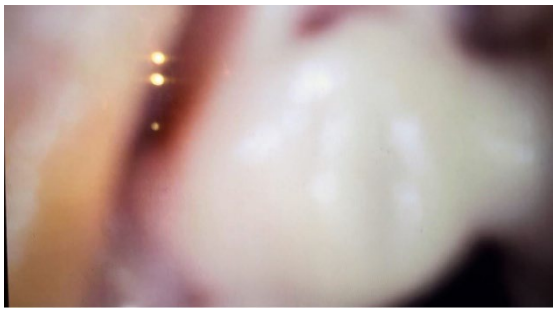
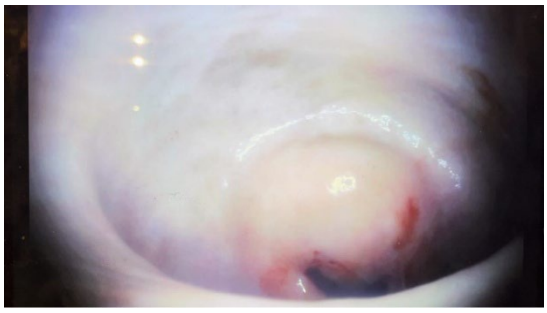


Patient N., aged 49, presented with complaints of a sensation of pressure and heaviness in the pelvic region, episodes of involuntary urine leakage during physical exertion (such as coughing or lifting heavy objects), and the absence of orgasm over the past several years, causing significant emotional distress and a reduction in quality of life. Her medical history revealed two spontaneous vaginal deliveries, chronic stress, and a sedentary lifestyle.

During gynaecological examination, cervical descent was observed, characterised by downward movement on straining. A reduction in PFM tone was noted and confirmed by palpation tests. The patient reported difficulty relaxing the pelvic muscles during sexual intercourse and an absence of positive intimate sensations.

Following a course of therapy, the patient reported a reduction in the sensation of pressure and heaviness in the pelvic area, owing to improved PFM tone and enhanced cervical support. Episodes of stress-induced urinary leakage diminished. Through relaxation training and emotional regulation techniques, intimate sensations improved, and orgasmic function began to recover. Overall well-being was enhanced due to reduced stress and increased physical activity, resulting in a marked improvement in quality of life.

Case 7. Anterior Vaginal Wall Prolapse, Stress Urinary Incontinence, Loss of Libido and Orgasmic Function

Patient M., aged 48, presented with complaints of pronounced discomfort in the vaginal and pelvic region, a sensation of pressure and bulging along the anterior vaginal wall, which intensified during physical exertion and after prolonged standing. She also reported involuntary urine leakage during coughing, laughing, and lifting heavy objects. The patient expressed deep dissatisfaction with her intimate life, noting a marked decline in sexual desire (libido) and a complete absence of orgasms over the past several years. Increased fatigue and a lowered emotional tone were also observed.

Her medical history included multiple vaginal deliveries and menopause occurring two years prior.

Following a course of rehabilitation, Patient M. reported a notable reduction in discomfort and the sensation of vaginal wall protrusion, particularly during physical activity and prolonged standing. Strengthening of the PFM resulted in a significant decrease in involuntary urine leakage during coughing, laughter, and lifting. Moreover, the patient experienced an improvement in libido and restoration of intimate sensations, including the return of orgasms. Her overall vitality and emotional well-being also improved, contributing to an enhanced quality of life.

This review presents seven clinical observations, each illustrating various manifestations of pelvic organ prolapse, urinary incontinence, dyspareunia, and sexual dysfunction. For each case, photographic materials are provided, demonstrating patients' conditions before and after completing a rehabilitation programme using BFB-based equipment. These visual records provide compelling evidence of the stability and effectiveness of the achieved therapeutic outcomes.

A major finding of therapy involving BFB technology was a marked improvement in sexual health and psycho-emotional balance among participants. Beyond measurable gains in PFM function, many women reported distinct positive changes in sexual responsiveness, which represents a critical indicator of holistic recovery.

Throughout the training course, a steady upward trend in libido and heightened pelvic sensitivity was recorded, directly enhancing the quality of sexual intimacy. Numerous participants reported stronger and more diverse orgasmic responses, greater satisfaction with their sexual life, and deeper emotional connection with their partners. These effects were attributed to improved neuromuscular coordination, increased blood circulation, and restored muscle tone, all of which contributed to more intense and fulfilling sensations.

Furthermore, the therapy had a beneficial impact on general emotional state and overall quality of life. The reduction of incontinence symptoms, disappearance of pelvic pain and discomfort, and restoration of confidence led to diminished stress and anxiety, improved self-esteem, and enhanced social activity. This psychosomatic stability also contributed to better sleep and overall well-being.

An interesting and secondary effect observed during therapy was improvement in skin condition and external appearance. Enhanced pelvic blood flow and general relaxation of muscular tension promoted greater skin tone and elasticity, which manifested in a fresher, healthier complexion. Participants noted reduced signs of fatigue, smoother skin texture, and a more vibrant facial appearance, which further reinforced the overall psychological comfort and motivation for self-care.

Changes in intimate perception, accompanied by partial or complete normalisation of PFM function, substantially expanded the possibilities for a full and harmonious sexual life. These outcomes exerted a profound influence not only on physical health but also on the emotional and psychological well-being of the women involved. Such a comprehensive therapeutic effect confirms that BFB-based rehabilitation techniques not only restore anatomical and functional parameters but also significantly improve quality of life in a broader sense.

In conclusion, the application of modern physiotherapeutic methods using BFB in pelvic floor rehabilitation contributes not only to measurable improvements in muscle performance but also to broader benefits encompassing reproductive, urogenital, and emotional health.

To further substantiate these findings, the study is being extended to a larger cohort of 50 clinical cases (*Table 1*), which will allow for a more detailed assessment of variability, treatment efficacy under differing conditions, and optimisation of training protocols.

The effects and results identified in this research collectively explain the multidimensional impact of PFM training on libido and orgasmic responsiveness.

1. Neurophysiological Aspect: The Role of Motoneurons and Afferent Feedback

The PFM are under the control of lower motoneurons located in the sacral spinal segments (S2–S4), responsible for their voluntary contraction and relaxation. Systematic training of these muscles activates not only efferent motor pathways but also stimulates numerous afferent nerve fibres that send sensory impulses to the CNS.

This afferent stimulation reaches the hypothalamus and limbic system—key centres responsible for regulating emotions, sexual behaviour, and hormonal balance. The intensified flow of sensory input facilitates the activation of neurotransmitters such as dopamine and serotonin, both essential for sexual motivation and mood regulation. The increased dopaminergic activity is directly associated with enhanced libido and greater motivation for sexual intimacy.

2. Enhancement of Blood Circulation and Its Significance

Conscious activation of the PFM induces cyclical contractions that exert a mechanical influence on the vascular network of the pelvic region. This promotes venous outflow and arterial inflow to the genital organs—specifically, the clitoral and vaginal areas in women.

Improved blood circulation creates favourable conditions for:

- The nourishment of tissues with oxygen and essential nutrients;
- The optimisation of smooth muscle function responsible for erection and vaginal secretory activity;
- The enhancement of blood flow to the adrenal glands and the pituitary gland, both crucial centres of endocrine regulation.

Thus, regular training not only improves the local condition of tissues but also supports the maintenance of a balanced hormonal background.

3. Muscle Tone and Its Influence on Sexual Sensations

Pelvic floor dysfunctions manifested as hypotonia or discoordination of muscles disrupt the biomechanics of sexual activity, diminishing sensitivity and impairing orgasmic response.

Targeted training restores optimal muscle tone, leading to:

- Improved control over the musculature involved in sexual intercourse;
- Enhanced stimulation of sensory receptors located along the vaginal wall and surrounding tissues;
- Increased orgasmic quality through more synchronised and forceful muscular contractions.

In male therapy, a comparable effect is observed—training enhances control over contractions, improves erection, and allows for better management of the orgasmic response.

4. Psychosomatic Effect and Influence on Emotional State

Conscious regulation of PFM activity exerts a beneficial impact on emotional balance. Strengthened control over one's body reduces anxiety, enhances body awareness and self-confidence—all of which are vital for healthy sexual functioning.

The psychological component, including stress reduction and improved self-esteem, creates a favourable background for heightened libido and more complete orgasmic experiences.

5. Overall Impact and Rationale

Training of the PFM exerts a multidimensional influence—it enhances vascular perfusion of the tissues, stabilises hormonal mechanisms through the hypothalamic–pituitary–adrenal axis, activates the CNS via afferent pathways, and restores muscle tone and sensitivity.

These processes are interrelated and, taken together, promote stronger sexual desire and improved orgasmic quality in women. This relationship positions pelvic diaphragm training as a vital and effective component of comprehensive therapy for sexual dysfunctions.

In the presented study, 50 women with various pelvic disorders—including pelvic organ prolapse, stress urinary incontinence, and diminished sexual satisfaction—took part. Each participant completed an individually tailored course of BFB-assisted training aimed at strengthening and normalising PFM function.

The study results demonstrate high efficacy of the applied methodology. Most participants exhibited sustained improvement in both objective indicators (muscle tone and contractile strength) and subjective sensations—reduction of incontinence symptoms, decreased prolapse severity, and significant enhancement of comfort in daily and intimate life. Notably, each major improvement was accompanied by detailed dynamic monitoring, precisely recorded via video

diagnostics. This allowed real-time adjustment of the training programme and ensured gradual, controlled progress.

Particular attention should be paid to the stability of achieved results. Follow-up assessments conducted several months after the course completion confirmed that positive outcomes persisted in the majority of participants, indicating long-term effects of the training on muscular balance and pelvic floor function. This reliability is directly attributable to the use of BFB technology, which enables participants to consciously control muscular contraction and relaxation, thereby maximising the efficiency of every session.

Accurate and objective monitoring through BFB equipment also revealed common recovery patterns and individual characteristics of each participant, allowing precise adaptation of the therapeutic process. As a result, the proposed method proved itself as a systematic tool for comprehensive rehabilitation—it not only promotes rapid symptom correction but also establishes lasting muscular control and enhanced functional coordination.

This clinical investigation, encompassing 50 individual cases, substantiates that BFB-assisted pelvic floor training using specialised equipment is a promising and reliable method for achieving high-quality, long-term restoration of pelvic functions. Such an approach opens new perspectives for the prevention and treatment of pelvic disorders, significantly improving women's quality of life and reinforcing their confidence in their physical and emotional wellbeing.

Discussion

The issue of PFM dysfunction remains one of the key challenges in modern physiotherapy, urology, and gynaecology, as it directly affects women's quality of life. Despite the advancement of both conservative and surgical treatments, the number of women experiencing symptoms such as urinary incontinence, pelvic organ prolapse, and sexual dysfunction remains high. This underscores the importance of research aimed at identifying safe and sustainable non-surgical approaches to restore pelvic floor function.

The results of the present study confirm that BFB technologies hold substantial potential within comprehensive therapy. They combine physiological effectiveness with psychological comfort, enabling patients to develop conscious control and awareness of their bodies. Such an approach not only restores physical functions but also contributes to improved emotional well-being, which is particularly significant in cases of chronic stress and sexual dysfunctions.

However, despite extensive evidence supporting the efficacy of BFB, unresolved issues remain regarding the standardisation of training methodologies and protocols. Variations in EMG recording parameters, session frequency, and duration make cross-comparison of clinical outcomes challenging. To enhance the reliability of results, unified clinical guidelines should be developed, including sensor types, signal processing algorithms, and criteria for assessing progress dynamics.

The long-term effects of BFB therapy also warrant further investigation. Although short-term improvements are well-documented, data on the sustainability of therapeutic outcomes over several years remain limited. It is therefore advisable to conduct multi-centre longitudinal studies to evaluate the persistence of effects and their influence on endocrine and psycho-emotional systems.

A particularly promising direction lies in integrating BFB methods with digital and telemedical platforms. Studies by Hao et al. (*2024*) and other specialists demonstrate that remote feedback-based training programmes delivered via mobile applications can significantly expand access to physiotherapy. This is especially valuable for the prevention of age-related and postnatal disorders in populations with restricted mobility.

Of special interest is the relationship between conscious PFM control and sexual function. The data presented in this study indicate that neurophysiological stimulation of afferent pathways improves hormonal regulation and enhances libido, opening new prospects for sexological and psychophysiological rehabilitation.

Hence, future research should focus on:

1. Developing standardised BFB training protocols tailored to different age and clinical groups;
2. Exploring the neurophysiological mechanisms linking PFM activity and endocrine regulation;
3. Designing digital systems for monitoring training effectiveness and creating predictive recovery models;
4. Expanding the clinical evidence base regarding long-term outcomes of BFB interventions.

The integration of device-based technologies, interdisciplinary collaboration, and personalised rehabilitation programmes establishes BFB therapy as a strategically important field in modern medicine, aiming to improve women's quality of life and prevent urogenital disorders.

Conclusion

Contemporary medicine regards pelvic floor health as one of the key indicators of women's overall quality of life, influencing physical, psycho-emotional, and sexual well-being. In recent decades, there has been a notable rise in clinical cases of stress urinary incontinence, pelvic organ prolapse, and postnatal dysfunctions, largely driven by lifestyle changes, ageing, and childbirth-related consequences. As shown by Grimes and Stratton (*2025*), Tibaek and Dehlendorff (*2013*), and Samsonova et al. (*2023*), the prevention and rehabilitation of such disorders require an integrated approach that unites neurophysiology, physiotherapy, endocrinology, and psychosomatic medicine.

Author's study gains particular relevance in the era of rapidly expanding technological and digital innovations in rehabilitation medicine. The use of BFB, electromyography, and telemetric monitoring opens new horizons for non-invasive therapy and scientific analysis of pelvic motor control mechanisms.

The classical works of Basmajian and De Luca (*1985*) laid the foundation for understanding the electrophysiological mechanisms of skeletal muscle activity. EMG registration of PFM activity has since become a cornerstone of modern BFB training protocols. Dornowski et al. (*2018*) and Huber et al. (*2020*) demonstrated that EMG-based feedback not only increases pelvic muscle strength and endurance but also fosters the development of new motor patterns, ensuring the durability of therapeutic effects.

Research by Constantinou et al. (*2007a*; *2007b*), Peng et al. (*2007*), Omata et al. (*2003*), and Parkinson et al. (*2019*) has shown that the use of direction-sensitive and fibre-optic sensors

allows precise measurement of pressure distribution within the vaginal canal and high-resolution assessment of pelvic biomechanics. This shift from empirical to quantitative diagnostic methods has enabled the development of individualised therapeutic protocols.

In clinical practice, the combination of electrical stimulation, physical exercise, and BFB techniques has proven highly effective. Studies by Al-Shukri et al. (*2016*), Serov et al. (*2022*), and Kolgaeva (*2020*) show that electromyostimulation and visual feedback training accelerate post-surgical recovery, alleviate symptoms of urinary incontinence, and prevent secondary complications. These approaches are characterised by high safety and minimal side effects, a finding also confirmed in international studies (*Lee et al., 2013*; *Hay-Smith et al., 2024*).

A key advantage of the BFB method lies in engaging the CNS in the recovery process. Afferent stimulation of the sacral spinal segments (S2–S4) activates the hypothalamic–pituitary–adrenal axis, increasing dopamine and serotonin production and thereby improving emotional stability and libido. This effect, confirmed in Romanova's clinical observations, aligns with Rachin et al. (*2020*), who highlighted the role of psychophysiological adaptation in chronic pelvic pain.

Leonov (*2012*) emphasised the importance of psychological factors in post-traumatic rehabilitation, noting that physiological self-regulation through BFB reduces anxiety and restores body confidence. In women's rehabilitation, this manifests as improved sexual sensitivity, reduced vaginismus, and enhanced intimate perception—findings also reflected in the present study.

A synthesis of national and international evidence demonstrates the broad therapeutic potential of BFB for urinary incontinence, prolapse, chronic pelvic pain, and sexual dysfunctions. Zhumanova (*2023*) reported that combining CO_2 laser therapy with electromyostimulation improves tissue elasticity and enhances post-surgical recovery, while Chemidronov et al. (*2023*) confirmed that physical training combined with device-assisted stimulation effectively prevents age-related deterioration.

Comparative analyses indicate the superiority of multi-level rehabilitation programmes. Hay-Smith et al. (*2008*; *2024*), Fukuda et al. (*2022*), and Curillo-Aguirre and Gea-Izquierdo (*2023*) stress that the integration of active exercises, sensory control, and psycho-emotional support yields the best therapeutic outcomes.

The development of wearable and remote technologies marks a new stage in physiotherapy evolution. Alzahrani, Ullah (*2024*), and Hao et al. (*2024*) demonstrate that tele-rehabilitation using mobile BFB devices and cloud platforms significantly improves treatment adherence, particularly among women with limited access to clinics. These technologies facilitate self-monitoring, automatic workload adjustment, and dynamic progress analysis.

Another promising direction is the integration of EMG diagnostics with artificial intelligence to enable predictive modelling and early detection of pathology. Raalte and Egorov (*2015*) and Cacciari et al. (*2017*) illustrate the potential of tactile imaging and three-dimensional pressure mapping, paving the way toward personalised medicine.

Clinical observations and literature evidence confirm that pelvic floor rehabilitation extends beyond anatomical correction. Restoring muscle control enhances self-esteem, reduces anxiety, and promotes better sleep and emotional balance. Samsonova et al. (*2023*) highlighted a strong correlation between pelvic muscle function and overall life quality. Similarly, Shashkova and

Batueva (*2021*) emphasised that excessive strength training without EMG control can provoke hypertonicity and incontinence, whereas systematic BFB-based exercises maintain an optimal balance between muscle strength and flexibility.

Despite these achievements, several issues remain for further investigation, including the standardisation of BFB protocols, the optimal frequency and duration of sessions, and the establishment of unified criteria for evaluating effectiveness and long-term outcomes. Large-scale multicentre studies are needed to validate the durability of therapeutic results, particularly in older and postmenopausal populations.

An additional promising direction is exploring the relationship between EMG indicators and endocrine dynamics. Madokoro and Miaki (*2019*) and Hsu et al. (*2018*) indicate that restoring pelvic muscle tone can positively influence hormonal balance and metabolic regulation, forming the basis for integrated prevention programmes for metabolic syndrome and osteoporosis in women.

Conflict of Interest

The author declares that there is no conflict of interest.

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Appendix

Table 1. Sample

No.	Symptoms	Therapeutic Outcomes
1	Complaints of stress, internal tension, and recurrent episodes of urinary incontinence. Impaired blood supply to the mucous membranes resulting in dryness and discomfort. Pelvic organ descent with clinical signs of prolapse.	Elimination of urinary incontinence episodes and improvement of PFM functionality. Normalization of blood circulation and enhancement of the mucosal condition. Reduction of prolapse symptoms and increased tone of the pelvic organs.

2	Dyspareunia caused by internal muscle tension and postnatal stretching of tissues. Emotional instability and stress associated with post-pregnancy hormonal changes. A sensation of heaviness and pressure in the perineal region.	Reduction of dyspareunia and restoration of muscle tone after childbirth. Improvement of psycho-emotional well-being, reduction of anxiety and depressive symptoms. Overall improvement of pelvic organ condition and elimination of the sensation of heaviness.
3	Stress and chronic fatigue leading to pelvic muscle hypertonicity. Menstrual irregularities, including dysmenorrhoea and lower abdominal pain. Decreased libido and sexual desire.	Reduction of stress and muscular tension with improvement in PFM condition. Normalization of the menstrual cycle and alleviation of menstrual pain. Increase in libido and improvement of sexual health.
4	Pelvic heaviness and pain, discomfort in the lower abdomen, and symptoms of organ prolapse. Chronic low back pain associated with pelvic dysfunction. Psychological stress and irritability, accompanied by impaired concentration and mood disturbances.	Relief of pelvic pain and heaviness with enhanced organ support. Reduction of back pain and improvement of general physical condition. Enhancement of mood and stabilization of psycho-emotional balance.
5	Urinary disorders: frequent urgency and urinary incontinence. Reduced PFM tone following childbirth. Chronic stress and nervous tension leading to impaired sleep quality.	Elimination of urinary incontinence symptoms and improvement of pelvic muscle functionality. Restoration of normal PFM condition. Improvement of sleep quality and reduction of stress levels.
6	Irregular menstrual cycle and hormonal imbalance. Pelvic pain caused by postpartum tissue stretching and chronic muscle tension. Sexual dysfunction, decreased libido.	Normalization of the menstrual cycle and restoration of hormonal balance. Reduction of pelvic pain and recovery of muscle tone. Enhancement of sexual function and increased libido.
7	Vaginal mucosal dryness and discomfort during sexual intercourse. Pelvic organ prolapse with sensations of pressure and heaviness in the perineal area. Stress, depressive mood, and elevated anxiety.	Elimination of vaginal discomfort and improvement of mucosal condition. Restoration of normal pelvic organ positioning and reduction of perineal pressure. Improvement of psycho-emotional state with decreased anxiety and depressive symptoms.
8	Stress and nervous tension, mood disturbances, and insomnia. Pelvic organ dysfunction and weakness of the PFM. Dyspareunia associated with impaired pelvic blood flow.	Improvement in psycho-emotional well-being and normalisation of sleep. Restoration of muscle tone and enhancement of pelvic organ function. Elimination of pain during sexual intercourse and improvement of local blood circulation.
9	Decreased libido and reduced sexual activity. Lower abdominal pain and menstrual irregularities related to hormonal imbalance. Increased anxiety and emotional tension.	Enhancement of libido and improvement of sexual function. Normalisation of the menstrual cycle and reduction of lower abdominal pain. Reduction of anxiety and improvement of psycho-emotional stability.
10	Dyspareunia caused by reduced PFM tone and vaginal dryness. Emotional tension, insomnia, and stress associated with psychological distress.	Reduction of pain during sexual intercourse and improvement of mucosal integrity. Stress reduction, better sleep quality, and improved psycho-emotional state.

	Mild pelvic organ prolapse and a sensation of pelvic heaviness.	Restoration of normal pelvic organ position and relief of pelvic heaviness.
11	Menstrual cycle disturbances and severe lower abdominal pain associated with hormonal fluctuations. Frequent urination and episodes of urinary incontinence. Emotional tension, anxiety, and stress.	Normalisation of the menstrual cycle and alleviation of abdominal pain. Elimination of urinary incontinence and strengthening of PFM tone. Reduction of anxiety and improvement of emotional well-being.
12	Decreased libido and diminished sexual desire. Pelvic organ prolapse with sensations of heaviness and pressure in the abdomen. Stress, depressive symptoms, and insomnia.	Enhancement of libido and restoration of sexual desire. Correction of pelvic organ descent and improvement of pelvic support. Improved emotional well-being and restoration of normal sleep patterns.
13	Dyspareunia caused by vaginal dryness and muscular tension. Emotional instability and depressive manifestations. Menstrual irregularities due to dysregulation of the hormonal cycle.	Relief of pain during sexual intercourse and improvement of vaginal mucosal condition. Mood elevation and reduction of depressive and anxious symptoms. Regulation of the menstrual cycle and reduction of dysmenorrhoeic pain.
14	Uterine prolapse and pelvic organ support dysfunction. Chronic lower back pain due to weakness of the pelvic musculature. Psychological distress and emotional imbalance caused by chronic stress.	Restoration of normal uterine position and alleviation of prolapse symptoms. Reduction of back pain and improvement of pelvic muscle tone. Stress reduction and stabilisation of psycho-emotional balance.
15	Postpartum abdominal and back pain, striae, and loss of muscular tone. Stress and nervousness leading to general malaise. Impaired blood circulation and vaginal dryness.	Improvement of muscle tone after childbirth and reduction of abdominal and back pain. Enhancement of emotional well-being and reduction of stress levels. Improved blood circulation and restoration of mucosal health.
16	Pelvic organ prolapse accompanied by sensations of pressure and heaviness in the pelvic region. Urinary incontinence during laughter or physical exertion. Hormonal imbalance with mood fluctuations.	Elimination of pelvic pressure and heaviness, restoration of normal anatomical organ position. Reduction in episodes of stress urinary incontinence. Stabilisation of hormonal balance, improvement in mood and emotional well-being.
17	Low back and hip pain associated with insufficient pelvic organ blood supply. Menstrual irregularities and hormonal dysfunction. Emotional tension and stress affecting general health status.	Reduction in back and hip pain, improved pelvic blood circulation. Normalisation of the menstrual cycle and hormonal regulation. Decreased stress levels, improved overall well-being and mood.
18	Pain and discomfort in the genital area occurring postpartum. Stress and mood instability negatively influencing physical health. Reduced libido and impaired sexual function.	Improvement of the postpartum condition of the genital area, relief from pain and discomfort. Increase in libido and enhancement of sexual health. Reduction of stress, improvement of mood and emotional stability.
19	Vaginal mucosal dryness and dyspareunia (painful sexual intercourse).	Restoration of vaginal mucosal integrity and elimination of pain during intercourse.

	Voiding dysfunction, including stress urinary incontinence during physical activity. Emotional tension, stress, and depressive symptoms.	Reduction of urinary incontinence symptoms and improvement of PFM tone. Alleviation of depressive manifestations and enhancement of psychological well-being.
20	Pelvic and perineal pain related to organ prolapse and postpartum tissue stretching. Menstrual irregularities and unstable menstrual cycle. Stress, nervousness, and general psycho-emotional decline.	Reduction of pelvic and perineal pain, correction of organ positioning. Normalisation of menstrual cycle and reduction of abdominal pain. Improved psycho-emotional state, decreased stress and irritability.
21	Stress urinary incontinence during physical exertion and coughing. A sensation of heaviness in the pelvic floor area; uterine descent. Stress, anxiety, nervousness, and frequent depressive moods.	Elimination of stress urinary incontinence and improved PFM function. Restoration of the normal anatomical position of the uterus and reduction of the sensation of heaviness. Decreased stress and anxiety levels, with improvement of overall psycho-emotional well-being.
22	Pain and discomfort in the lumbar and hip regions caused by postpartum muscle strain. Partial impairment of pelvic circulation and vaginal mucosal dryness. Menstrual irregularities and cycle disturbances.	Reduction of lumbar and hip pain, enhancement of pelvic blood flow. Restoration of regular menstrual function. Improved condition of the vaginal mucosa and increased PFM tone.
23	Endocrine dysfunction and hormonal imbalance. Decreased libido and impaired sexual activity. Persistent fatigue, stress, and nervous tension.	Stabilisation of hormonal balance and improvement of metabolic processes. Increased libido and enhancement of sexual function. Higher energy levels and improved psycho-emotional stability.
24	Pelvic organ prolapse associated with weakened musculature. Chronic pelvic and perineal pain; discomfort during sexual intercourse. Stress, emotional exhaustion, and reduced work capacity.	Restoration of normal pelvic organ position and improved functional integrity. Reduction of pelvic and perineal pain and discomfort. Enhanced psycho-emotional state and reduced stress levels.
25	Severe dysmenorrhoea accompanied by pronounced fatigue and irritability. Reduced libido and sensation of physical exhaustion. Increased anxiety, depressive symptoms, and poor sleep quality.	Alleviation of lower abdominal pain and normalisation of the menstrual cycle. Improved libido and overall physical condition. Better sleep quality and reduction of anxiety and depressive manifestations.
26	Vaginal dryness and pain associated with hormonal changes. Urinary disturbances and increased frequency of micturition. Emotional instability, irritability, and anxiety.	Restoration of vaginal mucosal integrity and relief of pain. Reduction in urinary urgency and normalization of bladder function. Decreased nervous tension and improvement in overall mood.
27	Pelvic and hip pain resulting from muscle tension and reduced mobility. A sensation of weakness in the perineal region leading to difficulty maintaining pelvic organ support.	Reduction in pelvic and hip pain and muscle tension. Restoration of normal pelvic organ position and improved muscle tone. Enhanced stress resilience and stabilization of emotional state.

	Stress, depressive mood, and decreased psycho-emotional resilience.	
28	Muscle laxity and decreased tone after childbirth, associated with pelvic organ descent. Back and pelvic pain accompanied by muscular tension and restricted mobility. Menstrual irregularities and hormonal imbalance.	Elimination of muscle laxity and restoration of normal muscular tone. Reduction of back and pelvic pain with improved mobility. Normalization of menstrual cycle and hormonal status.
29	Stress urinary incontinence occurring during physical exertion. Sexual dysfunction, discomfort, and dyspareunia. Stress and depressive symptoms, deterioration of psycho-emotional wellbeing.	Resolution of urinary incontinence and strengthening of PFM function. Reduction of pain during intercourse and improvement of sexual performance. Mood elevation with reduced symptoms of depression and stress.
30	Menstrual cycle disturbances, including irregular and painful menstruation. Uterine prolapse accompanied by a sensation of pressure and heaviness in the perineal area. Stress, heightened anxiety, and depressive manifestations.	Normalization of the menstrual cycle and alleviation of dysmenorrhea. Improvement in uterine position and reduction of pelvic heaviness. Decreased anxiety and enhancement of overall psycho-emotional wellbeing.
31	Urinary incontinence during physical activity or exertion. Painful sensations in the genital area caused by postnatal tissue stretching. Chronic tension in the pelvic and lumbar regions.	Improvement of pelvic muscle function and elimination of urinary incontinence episodes. Reduction of genital pain and recovery after soft tissue stretching. Decreased pelvic and lower back tension, enhanced mobility.
32	Decreased tone of the PFM leading to organ prolapse. Menstrual irregularities, including dysmenorrhoea and cycle disturbances. Chronic fatigue and stress resulting in reduced work capacity.	Restoration of normal pelvic organ position and improvement of their functional activity. Normalization of the menstrual cycle and reduction of menstrual pain. Increased vitality and improved mood and psycho-emotional stability.
33	A sensation of heaviness in the pelvic and abdominal areas caused by uterine descent. Impaired pelvic blood circulation and vaginal mucosal dryness. Emotional instability and frequent mood fluctuations.	Correction of uterine position and elimination of pelvic heaviness. Normalization of pelvic blood flow and improvement of mucosal condition. Reduction of emotional instability and enhancement of psychological well-being.
34	Stress, depression, and unresolved emotional conflicts. Pain in the lower abdomen and lumbar region caused by muscular tension and overstretching. Sexual dysfunction and decreased libido.	Reduction of stress and depressive symptoms with overall emotional improvement. Relief of lower abdominal and lumbar pain with restoration of muscle tone. Increased libido and improvement of sexual function.
35	Urinary incontinence, particularly postpartum. Decreased sexual desire and discomfort during intercourse. Hormonal imbalance accompanied by mood swings.	Elimination of urinary incontinence episodes and improved PFM control. Reduction of dyspareunia and enhancement of sexual desire. Stabilization of hormonal balance and improvement of mood.
36	Vaginal mucosal dryness and impaired local circulation.	Improvement of vaginal mucosal condition and restoration of normal blood flow.

	Intestinal dysfunction, constipation, and abdominal discomfort. Chronic back and lumbar pain associated with decreased muscle tone.	Resolution of intestinal problems and enhancement of peristaltic activity. Reduction of back and lumbar pain, with improved mobility and muscle function.
37	Decreased libido and reduced sexual activity. Persistent lower abdominal pain caused by hormonal imbalance. Emotional fatigue and depressive symptoms.	Increased libido and improved sexual activity. Reduction of abdominal pain and restoration of hormonal balance. Enhanced energy levels and improvement of psycho-emotional well-being.
38	Pelvic organ prolapse and PFM weakness. Urinary dysfunction with increased urgency. Emotional tension and general malaise.	Restoration of normal pelvic organ positioning and improved functional status. Reduction in urinary urgency and improved bladder control. Decreased emotional tension and enhanced overall well-being.
40	Impaired pelvic blood circulation, vaginal dryness, and discomfort. Lower abdominal pain related to hormonal fluctuations. Sleep disturbances and increased anxiety.	Improved pelvic organ perfusion and elimination of discomfort. Reduction of abdominal pain and normalization of hormonal balance. Improved sleep quality and decreased anxiety and stress.
41	Stress urinary incontinence during coughing or sneezing. Pelvic discomfort and pain due to postpartum muscle weakness. Psycho-emotional instability, irritability, and depressive mood.	Elimination of urinary leakage episodes and improved PFM function. Reduction of pelvic pain and discomfort, with restoration of normal muscle tone. Improved mood and reduction of depression and irritability.
42	Lower abdominal pain associated with hormonal imbalance. Frequent stress reactions and emotional fluctuations. Reduced libido and impaired sexual activity.	Reduction of abdominal pain and normalization of hormonal status. Decreased stress and improved psycho-emotional stability. Increased libido and enhanced sexual activity.
43	Uterine prolapse and constant sensation of pelvic pressure. Frequent headaches, fatigue, and nervousness. Menstrual irregularities and dysmenorrhea.	Restoration of normal uterine position and elimination of pelvic pressure. Reduction of headaches and fatigue, with overall improvement in well-being. Regulation of menstrual cycle and alleviation of menstrual pain.
44	Vaginal dryness and dyspareunia. Nervousness, insomnia, and stress-related disorders. Pelvic circulatory insufficiency and sensation of heaviness.	Improved pelvic circulation and elimination of vaginal dryness. Improved psycho-emotional state and restoration of normal sleep patterns. Reduction of pain during intercourse and enhancement of sexual function.
45	Urinary incontinence during physical exertion. Decreased PFM tone after childbirth. Stress, anxiety, and low mood.	Elimination of urinary incontinence and improved control of PFM. Restoration of muscle tone and enhanced pelvic organ support. Reduced anxiety and improved emotional well-being.
46	Menstrual irregularities and hormonal imbalance.	Normalization of menstrual cycle and restoration of hormonal equilibrium.

	Lumbar and lower abdominal pain caused by postpartum strain. Emotional lability and irritability.	Reduction of lumbar and abdominal pain, with improved mobility. Decreased irritability and stabilization of emotional state.
47	Pelvic organ prolapse and muscular weakness. Impaired blood circulation and mucosal dryness. Stress, depression, and decreased performance capacity.	Restoration of normal pelvic organ positioning and increased muscle tone. Improved circulation and recovery of mucosal health. Enhanced work capacity and improved mood.
48	Pelvic tension and discomfort. Urinary disorders and incontinence. Chronic abdominal and back pain.	Reduction of pelvic tension and discomfort with restoration of normal function. Decreased episodes of urinary incontinence and improved voiding control. Relief of abdominal and back pain, with improved mobility.
49	Stress and nervousness affecting quality of life. Decreased libido and sexual activity. Sleep disturbances, insomnia, and general malaise.	Reduced stress and improved psycho-emotional balance. Enhanced libido and improved sexual function. Restoration of normal sleep and overall well-being.
50	Decreased libido and sexual desire. Pelvic pain and discomfort caused by hormonal changes. Emotional fatigue and depressive mood.	Increased sexual desire and libido. Reduction of pelvic pain and discomfort with hormonal normalization. Improved energy levels and psycho-emotional state.

Irina N. Khozhalova [a][6]

Moral and Ethical Education of Schoolchildren: Problems and Solutions [5]

Abstract:
Moral and ethical education of schoolchildren is one of the key objectives of the modern educational system. In the era of digitalisation, globalisation, and rapid social transformations, the formation of stable moral guidelines among the younger generation becomes an especially pressing issue. The school, alongside the family, plays a decisive role in shaping the child's personality, value system, and moral principles. However, under conditions of a crisis in family upbringing, it is precisely educational institutions that become the principal environment where a child may acquire moral guidelines and experience of positive interaction. Therefore, the search for effective solutions to the problems of moral and ethical education gains particular importance. The novelty of the study lies in presenting a comprehensive review of the challenges of contemporary moral and ethical education and possible solutions. The subject of the study is the problems of modern moral and ethical education exemplified by Russian society. The object of the study is representatives of the new generation of school-age society. The study aims to actualise the problem of contemporary moral and ethical education of children and adolescents in the society of the twenty-first century. In the course of the study, both general scientific methods, such as analysis and synthesis, induction and deduction, the comparative method, and the systemic approach, as well as selected psychological and pedagogical methods were employed. The author presents an analysis of the genesis of the issue of contemporary moral and ethical education, a comprehensive review of the problems of moral and ethical upbringing of the younger generation in modern society, and situational examples from social practice that clearly illustrate certain evident problems in the moral and ethical education of school-age children and adolescents, along with the development of updated pathways towards resolving this issue. The author concludes that addressing the problems of moral and ethical education is not merely a pedagogical, but a national task, upon the success of which the future of society depends. Sustainable development is possible only if society is able to foster a generation capable not only of successfully adapting to the challenges of modernity but also of maintaining fidelity to moral ideals, which constitute the foundation of a strong, cohesive, and sustainable society.

Keywords: moral and ethical education, problems of schoolchildren's upbringing, family functions, social communication, cyberbullying.

Introduction

Moral and ethical education of schoolchildren constitutes one of the key objectives of the modern educational system. In the era of digitalisation, globalisation, and rapid social transformations, the establishment of stable moral guidelines among the younger generation becomes an especially pressing issue. The information environment in which children grow up today is saturated with contradictory behavioural models that often substitute traditional values. The accessibility of the Internet and social networks facilitates the dissemination of aggression, consumerist ideology, and irresponsible attitudes towards life, which directly affect the worldview and behaviour of schoolchildren.

The school, alongside the family, plays a decisive role in shaping the child's personality, value system, and moral principles. However, under the conditions of a crisis in family

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upbringing, it is precisely educational institutions that become the principal space where a child may acquire moral guidelines and experience positive interaction. Contemporary schoolchildren encounter such challenges as the loss of respect for elders, declining interest in labour, and the blurring of the concepts of "duty", "honour", and "justice". This poses a threat to their comprehensive socialisation and civic development.

Therefore, the search for effective solutions to the problems of moral and ethical education acquires particular significance. It is essential to integrate the efforts of the family, school, state, and social institutions in order to foster in schoolchildren spiritual and moral values capable of ensuring the harmonious development of the individual and the consolidation of social stability.

The novelty of the study lies in presenting a comprehensive overview of the issues of contemporary moral and ethical education and the possible pathways for their resolution.

The subject of the study is the problems of contemporary moral and ethical education exemplified by Russian society.

The object of the study is representatives of the new generation of school-aged youth.

The study aims to actualise the issue of contemporary moral and ethical education of children and adolescents in the society of the 21st century.

To achieve this purpose, the following objectives were addressed:

- analyse the genesis of the problems of contemporary moral and ethical education;
- conduct a comprehensive review of the challenges of moral and ethical education of the younger generation in modern society;
- provide situational examples from the practice of contemporary society that vividly illustrate certain evident problems in the moral and ethical education of school-aged children and adolescents;
- develop and present updated pathways for addressing the problems of moral and ethical education of school-aged children and adolescents.

Methods

For the analysis of the problems and solutions concerning the moral and ethical education of schoolchildren in contemporary society, a set of general scientific and psycho-pedagogical methods was employed. Their application made it possible to identify both the objective trends in the transformation of children's and adolescents' value orientations and the specific features of the functioning of the school and the family under conditions of social change.

Among the general scientific methods, the following were used:

1. *Analysis and synthesis*. Analysis was applied to the study of pedagogical and sociological research on the problem of moral education, as well as to the identification of factors influencing the moral development of schoolchildren (weakening of the family, media influence, internet addiction). Synthesis enabled the integration of results from heterogeneous sources into a coherent understanding of the problem. For example, the comparison of data on media influence and cases of school conflicts helped to reveal a direct correlation between the informational environment and the change in pupils' values.
2. *Induction and deduction*. On the basis of an analysis of particular cases (e.g., examples of cyberbullying or consumerist attitudes towards education), general conclusions were

formulated regarding trends in moral development. The deductive approach was applied to test hypotheses concerning the influence of digitalisation and globalisation on the educational process.

3. *Comparative method*. Domestic and foreign approaches to moral education were compared, as well as differences in the value orientations of pupils from diverse social and cultural groups. In particular, the analysis of intercultural conflict in a multinational classroom made it possible to compare practices of integration and tolerance across different educational systems.
4. *Systemic approach*. Education was examined as a multi-component system encompassing the school, the family, society, and the media. This enabled the identification of interrelations between individual problems (e.g., the weakening of the family and the growth of internet addiction) and the determination of the necessity for comprehensive solutions.

Psychological and pedagogical research methods were aimed at examining the specific features of perception, behaviour, and value orientations of schoolchildren:

1. *Observation*. Systematic pedagogical observation of pupils' behaviour in both curricular and extracurricular activities made it possible to identify the particularities of communication, attitudes towards learning, and manifestations of aggression or empathy. For instance, observing adolescents' interactions in online environments allowed the researchers to record specific features of cyberbullying and to detect a lack of empathy among the aggressors.
2. *Conversation and questionnaire survey*. These methods made it possible to ascertain pupils' opinions regarding values significant to them, as well as their attitudes towards family, work, culture, and media. Conversations with parents and teachers contributed to identifying difficulties within the educational process and understanding the expectations of various participants in the educational environment. In cases of value conflicts within a multicultural classroom, conversations proved particularly effective in determining the actual causes of tension and in developing recommendations for teachers.
3. *Testing*. By employing psychodiagnostic techniques, the study examined the levels of developing moral concepts, the degree of empathy, and the propensity for cooperation or conflict. For example, testing of pupils who demonstrated a consumerist attitude towards education revealed a low level of intrinsic motivation and the predominance of pragmatic orientations.
4. *Analysis of creative outputs*. Essays, projects, and creative works produced by pupils were analysed, as they reflected their moral orientations. Within the framework of the study, the analysis of school essays on friendship, family, and values revealed discrepancies between adolescents declared and actual attitudes.
5. *Pedagogical experiment*. In certain cases, educational situations were modelled (e.g., participation in social projects, volunteering activities, role-playing games), which enabled the assessment of the effectiveness of various methods for developing moral qualities. For instance, the organisation of a charitable campaign demonstrated that the practical involvement of schoolchildren in socially significant activities fosters the development of empathy and responsibility.

Thus, the combination of general scientific and psychological-pedagogical methods ensured a comprehensive consideration of the problem of the moral education of schoolchildren. Their application made it possible to identify the main contradictions of the contemporary educational process, to specify the nature of the influence of family, school, and media on personality formation, and to substantiate ways of improving educational practices. The use of these methods renders the research comprehensive, objective, and of practical significance.

Literature Review

The problem of moral and ethical education of schoolchildren has traditionally been regarded as one of the central issues in pedagogy and psychology, since it ensures personality development, the formation of civic identity, and adaptation to social change. The Russian pedagogical tradition has for decades paid attention to the study of moral orientation. For instance, the works of A.V. Kovalev (*1982*), V.G. Ivanov and N.V. Rybakova (*1959*) emphasised the importance of educating the individual through the formation of moral norms and cognitive interests. Classical pedagogy, represented by the studies of I.P. Ivanov (*2021*), V.A. Karakovsky, L.I. Novikova, N.L. Selivanova (*2020*), and N.E. Shchurkova (*2021*), proposed collectivist models in which a leading role was attributed to joint activity and the school community. These ideas continue to evolve in contemporary concepts (*Gazman, 2019*; *Danilyuk et al., 2021*; *Metlik et al., 2018*; *Metlik, 2012*), which emphasise a humanistic approach and the synthesis of the educational efforts of family, school, and society.

Considerable attention is devoted to developing educational systems adapted to the conditions of the modern school. In the studies of V.M. Lizinsky (*2019*), E.N. Stepanov (*2020*), and P.V. Stepanov (*2019*), models of managing the educational process based on outcome assessment and a systemic approach are examined. The works of M.V. Shakurova (*2020*) propose technologies for the social pedagogue aimed at addressing the tasks of spiritual and moral development. The research of N.L. Selivanova (*2020*) and generalising publications on the moral education of young people in society highlight the necessity of updating methodological approaches under the conditions of global change and a crisis of values.

Empirical research directed towards studying the peculiarities of pupils' perception of moral norms plays a significant role in understanding this problem. Thus, N.A. Tkachenko and S.N. Natalich *(2018)* regard the moral education of schoolchildren as a psychological and pedagogical issue. T.M. Mukhopleva (*2013*), S.R. Petryaeva and E.N. Teselkina (*2024*) analyse the pedagogical conditions for the formation of value orientations among younger pupils. The practical orientation of these studies lies in identifying the opportunities available to the teacher for influencing the child's personal development through observation, conversation, and analysis of creative work. C.A. Khomushku (*2015*) considers the pathways of moral education of younger pupils in the educational process, demonstrating their interrelation with the overall strategy of personality formation.

Serious challenges to moral education are posed by the digital environment. Russian studies record the spread of cyberbullying and school bullying (*Averbukh et al., 2022a*; *Averbukh et al., 2022b*; *Nazarov et al., 2022*), and also analyse pupils' perceptions of these phenomena. G.U. Soldatova (*2019*) identifies the role structure of cyberbullying and the influence of family relations on the nature of children's coping strategies. Foreign studies complement these

findings: the works of W. Xiao and M. Cheng (*2023*) reveal the connection between internet addiction, moral disengagement, and aggression; the article by Mukherjee and Baksi (*2022*) demonstrates a negative correlation between internet addiction and moral foundations. Additional risk factors and psychosocial consequences of adolescents' excessive presence online are indicated (*Moskalenko et al., 2023*; *Malygin et al., 2017*; *Malygin et al., 2018*; *Neverkovich et al., 2018*). Comparative studies show that internet addiction reduces the level of moral strength and psychological capital of the individual (*Mukherjee & Baksi, 2022*; *Zewude et al., 2024*).

No less significant is the intercultural dimension of education. In a multi-ethnic society, the importance of research devoted to tolerance and intercultural interaction increases. Russian works emphasise the necessity of fostering in young people the capacity for dialogue (*Tsvyk & Tsvyk, 2020*), whereas foreign authors analyse the paradoxes of intercultural education and its moral challenges (*Tochon & Karaman, 2009*; *Frisancho & Delgado, 2018*). Contemporary studies demonstrate that the organisational culture of schools directly affects the character of conflicts and the level of their constructive resolution (*Kostovsky et al., 2025*). These findings allow moral education to be considered not only as an individual process, but also as a systemic phenomenon associated with educational policy and school climate.

An important direction of foreign research is constituted by the theory of character education. The works of J. Arthur (*2018*; *2021*), as well as collective studies by Arthur, Kristjánsson, Harrison, Sanders, and Wright (*2017*), develop the idea of integrating the cultivation of virtues with academic learning. Similar approaches have been developed in works on religious and secular education (*Ranam et al., 2022*; *Munawarsyah et al., 2022*; *Zhang, 2023*; *Zou, 2022*; *Ferková et al., 2023*; *Jiang & Wang, 2019*; *Mareš, 2020*). These publications indicate a trend away from normative moralising towards activity-based models of education grounded in the formation of competences and critical thinking.

A review of the literature makes it possible to identify several key directions:

- the preservation and development of traditional approaches;
- the renewal of educational systems under conditions of digitalisation, with research on internet addiction and cyberbullying;
- the intercultural dimension of moral education;
- the introduction of foreign practices of so-called character education.

Russian studies are predominantly oriented towards the preservation of spiritual and moral foundations and collectivist forms of education, while foreign research focuses on the development of virtues, intercultural competences, and the prevention of deviance. The cumulative analysis of sources demonstrates that, for the successful resolution of the tasks of modern education, a comprehensive approach is required, combining traditional and innovative models aimed at personal development, digital literacy, and intercultural dialogue.

Results

The Issues of Contemporary Moral and Ethical Education

Key Challenges

The modern school faces a wide range of problems in the sphere of moral education. First and foremost, this concerns the erosion of traditional moral foundations in society. Children grow up in a context of value pluralism, where the very same actions may be assessed in diametrically opposed ways depending on the social environment or cultural context.

The influence of information technologies and social networks creates additional complications. Schoolchildren receive a vast amount of contradictory information, often lacking the necessary experience to comprehend it critically. Virtual reality frequently replaces face-to-face communication, leading to distortions in the understanding of moral norms governing interpersonal interaction.

Thus, contemporary sociology and pedagogy identify the following issues of modern moral and ethical education:

1. Transformation of value orientations among children and young people,
2. Weakening of the educational function of the family,
3. The impact of mass media,
4. Dependence on information flows within the Internet environment,
5. Loss of social communication skills,
6. Decline in cultural receptivity,
7. Crisis of authority,
8. Neglect of historical continuity between generations.

The subsequent analysis will consider these issues in the context of the transformation of contemporary Russian society. They clearly demonstrate a close intertwining and interconnection both in their genesis and in the general logic of their resolution, since despite the multiplicity of problem dimensions, the focal object remains the same—schoolchildren of various age groups.

Transformation of Value Orientations among Children and Young People

Contemporary Russian society is undergoing large-scale social and cultural transformations that directly affect the upbringing of the younger generation. Children and young people find themselves in circumstances where traditional reference points are gradually losing their significance, while new models of behaviour and values have not yet fully formed. This results in a number of problems in the sphere of moral and ethical education that demand close attention from educators, parents, and the state.

Historically, the family has been the principal institution of socialisation, where the child acquired the first notions of good and evil, justice and responsibility. However, in recent decades there has been a significant weakening of its role. The reasons include social stratification, rising unemployment, forced migration, and the erosion of traditional moral and ethical norms. Parents, preoccupied with the search for means of subsistence, often fail to devote adequate attention to their children. As a consequence, the child is deprived of emotional support, control, and positive role models, which adversely affects his or her moral development.

The media today function as one of the most powerful sources in shaping worldviews. Yet their influence is by no means always positive. Easy accessibility of information, together with the widespread use of the Internet and social networks, leads to adolescents being confronted with a vast stream of low-quality content. The popularisation of violence, aggressive forms of communication, consumerist values, as well as the idealisation of criminal and idle lifestyles distort young people's perceptions of normative behaviour. In many cases, the media effectively assume the role of "educators", displacing the family and school.

Globalisation and mass culture have led young people increasingly to orient themselves towards Western models of behaviour, fashion, and leisure. While this phenomenon is not inherently negative, excessive fascination with external attributes contributes to the erosion of national cultural traditions and spiritual reference points. Youth imitate patterns of consumption without reflecting on the underlying values of their people, which results in an identity crisis and estrangement from cultural roots.

Labour has traditionally been regarded as the foundation of personality development and a means of socialisation. Today, however, many adolescents prefer to spend time in virtual spaces, favouring computer games, social networks, and digital entertainment. As a result, interest in creative activity diminishes, and motivation to exert effort for the sake of achievement decreases. An orientation towards easy success and the immediate gratification of needs is formed, leading to the devaluation of labour as a vital value.

Contemporary young people increasingly perceive education solely as a tool for securing well-paid employment. Its educational and cultural functions, meanwhile, are often disregarded. Values such as responsibility, conscientiousness, respect for elders, and care for others recede into the background. Consequently, a pragmatic worldview is formed, in which personal gain predominates, while collective and spiritual orientations gradually lose their significance.

Traditional categories that for centuries served as moral guidelines have lost clarity and distinctness for many young people. In conditions of constant social change, concepts such as "duty" and "honour" are often perceived as archaic. The declining role of spirituality leads to an internal crisis and the loss of moral bearings, which is reflected in the psychological state of adolescents. All this creates fertile ground for cynicism, indifference, and aggressive behaviour.

Thus, the problems of moral and ethical education and the transformation of value orientations among young people are complex and interconnected. Their resolution requires a systematic approach, encompassing the strengthening of the family as an institution, the development of the cultural and educational function of schooling, the creation of a positive media environment, and the promotion of national spiritual values. Only in this way is it possible to educate a generation capable not only of adapting to contemporary challenges but also of remaining committed to the moral ideals that make society strong and resilient.

Weakening of the Educational Function of the Family

Contemporary Russian society, being one of the most multilayered within the global community, is undergoing significant social transformations, which inevitably affect the upbringing of the younger generation. The family, as the principal institution of socialisation, is gradually losing part of its functions, which results in the weakening of children's moral and

ethical orientation. Alongside positive processes of societal development, serious challenges arise, requiring the attention of educators, psychologists, and parents themselves.

High parental workload has become one of the key reasons for the deficit of attention to children. The pursuit of career advancement and material well-being compels adults to devote the greater part of their time to work. As a result, the child is often left to his or her devices or placed under the supervision of other relatives. Such circumstances weaken the emotional bond between parents and children, which in the future may lead to alienation and a lack of trust.

Another issue is excessive parental overprotection. In seeking to shield the child from hardships and life's trials, parents deprive them of the opportunity to learn to overcome obstacles independently. Constant simplification of tasks and protection from challenges lead to adolescents being ill-prepared for real-life conditions, unable to cope with stress and to take responsible decisions.

Excessive strictness likewise exerts a negative influence on personality development. Under conditions of constant surveillance of every step, the child loses the ability to show initiative and acquire independence. Deprived of the right to choose, he or she grows into a dependent individual, incapable of self-organisation and internal discipline. Such an approach fosters passivity and insecurity, which subsequently impede the realisation of personal potential.

Parental disagreement on child-rearing strategies constitutes yet another serious problem. If mother and father adhere to opposing approaches, the child finds him- or herself in a situation of uncertainty, which obstructs the formation of stable moral values. Children require a consistent position that would enable them to develop independence, the ability to overcome difficulties, and a clear worldview. The absence of unity in upbringing leads to internal contradictions and lack of self-confidence.

Equally concerning is dependence on digital devices. Modern children spend increasing amounts of time in virtual environments, replacing direct human interaction with screen-mediated communication. Although technologies can be beneficial, their excessive use harms mental health, diminishes emotional intelligence, and impairs the ability to establish genuine social relationships. Adolescents begin to encounter difficulties in communication, and information overload becomes a serious test for their psyche.

The growing number of divorces aggravates the problem. Increasingly, children are raised in single-parent families, where one parent is absent. These fosters distorted perceptions of family life and deprives the child of a complete model of male and female roles within society. The absence of a stable family model may result in difficulties in forming personal relationships in adulthood and in mistrust towards the institution of the family itself.

To address these challenges, family upbringing must be based on respect, trust, and love. It is essential to revive and sustain family traditions, to instill in children a sense of belonging to their lineage, and to cultivate respect for parents and ancestors. Only when the family fulfils its educational function in its entirety can a harmonious personality be formed, capable of withstanding the challenges of modernity and preserving moral orientation.

Thus, the weakening of the family's educational role constitutes one of the most serious issues of contemporary society. Its resolution affects not only the well-being of an individual child but also the future of the nation as a whole, for it is precisely today's children who constitute tomorrow's society. The reinforcement of traditional family values, the creation of

conditions for the harmonious development of children, and the strengthening of the moral and ethical foundations of the family must become priorities for the state as well as for each individual.

The Influence of Mass Media

Advanced modern society is increasingly confronted with challenges associated with the influence of mass media. The role of the media has undergone radical change in recent decades: under market conditions, it has lost much of its educational significance, having substituted it with the function of entertainment and the satisfaction of consumer interests. Adolescents and young people find themselves in an environment where the principal value is not personality development and the cultivation of spiritual orientation, but rather the pursuit of easy pleasures and fashionable trends.

The situation is aggravated by the fact that in contemporary literature, cinema, music, and video culture, there is a notable absence of worthy role models. In earlier times, adolescents oriented themselves towards the heroes of books and films who embodied ideals of courage, loyalty, honour, and duty. Today, however, the leading figures are characters who display cynicism, the desire for success at any cost, material superiority, or aggression. Youth, in their search for role models, often imitate such attitudes, which undermines the moral foundations of their development.

An equally troubling factor is the frequent portrayal of violence and cruelty. From television screens and computer monitors, adolescents daily observe scenes of aggression, conflict, and criminal activity presented as a habitual part of life. This fosters the formation of a criminal subculture, cultivating tolerance or even interest in antisocial behaviour. Consequently, levels of empathy are diminished, humanistic values are eroded, and the risk of involvement in destructive practices increases.

Particularly dangerous is the fact that entertainment programmes create for young people the illusion of an ideal world. Vivid images, polished scenarios, and happy endings form false expectations and stereotypes that bear little resemblance to real life. Even death or tragedy is frequently presented as an element of spectacle, transformed into entertainment. Such an approach devalues notions of human dignity, compassion, and responsibility. Adolescents begin to perceive life as an endless stream of entertainment, in which any problem may be resolved instantly and without effort.

The virtual reality generated by the media also contributes to the degradation of communicative culture. Virtual contacts replace genuine human interaction, reducing the significance of sincere emotions and personal encounters. Young people increasingly resort to superficial forms of communication, where emotions are conveyed through emojis and short messages. Gradually, the skills of respectful dialogue, attentive listening, and empathy are lost. This has adverse consequences not only for adolescents' personal lives but also for their readiness for meaningful social and professional engagement.

Counteracting the negative influence of the media on children and youth requires joint efforts by parents, civil society organisations, and governmental institutions. Clear criteria must be established for the admissibility of certain forms of content in media and on the internet, and mechanisms of restricting access to questionable materials according to age must be

developed. It is particularly important to legislate the responsibility of website owners and media platforms for the content of information products published. Only in this way can a balance be maintained between freedom of speech and the protection of the moral health of the younger generation.

Thus, while the media constitute an essential part of contemporary life, carrying vast potential for education and cultural development, they also pose serious threats to the spiritual world of children and adolescents. To neutralise these risks, society must develop effective measures of control and educational influence aimed at forming in youth stable moral values, critical thinking, and respect for traditional cultural norms. Only under such conditions can the integrity of the individual be preserved and the harmonious development of future generations ensured.

Dependence on Information Flows in the Internet Space

The contemporary generation of children and adolescents is growing up within a digital society, where the internet has become an inseparable part of life. On the one hand, it provides immense opportunities for learning, creativity, and communication; on the other, it generates new risks for moral and ethical upbringing. Dependence on information flows produced in the internet environment exerts a profound influence on the consciousness and behaviour of youth.

Information oversaturation has become one of the principal problems. The World Wide Web continuously generates and transmits data, much of which is contradictory, unreliable, or ambiguous. An adolescent lacking sufficient life experience and critical thinking is vulnerable to this stream. Consequently, he or she may easily accept a distorted picture of the world as reality, forming negative perceptions of events, people, or phenomena.

The displacement of real communication by virtual interaction has also become a noticeable trend. Many schoolchildren prefer to spend their time on social networks or in messengers, substituting face-to-face communication with online interaction. Over time, this results in the loss of interpersonal communication skills, the ability to express emotions, and to read them in others. The need for real meetings and conversations declines, rendering adolescents more withdrawn and less prepared for life in a community.

Equally dangerous is the influence of certain internet resources. The web contains sites that promote violence, cruel games, or abuse of people and animals. Particularly alarming is the existence of platforms where adolescents are encouraged to inflict self-harm or are incited towards destructive actions. Such resources not only foster indifference towards the suffering of others but also damage the psyche of children themselves.

Manipulation of consciousness represents yet another serious threat. Hidden technologies of influence are actively employed online to involve adolescents in extremist communities, antisocial practices, or dangerous games. Frequently this is accompanied by the romanticisation of suicide, aggression, or law-breaking. Adolescents, in their quest for self-expression and recognition, are especially vulnerable to such influences.

These issues require solutions, first and foremost on the part of the family. Parents must nurture independence and responsibility in their children, while cultivating the capacity for empathy and compassion. The personal example of adults remains the primary means of

transmitting moral values: it is in everyday situations that the child learns to perceive and understand kindness.

Parental control is also of great significance. It should manifest not as total surveillance but as genuine interest in the child's friendships, hobbies, and viewing habits. Rather than strict prohibitions, it is more effective to offer alternatives—engaging activities, creative clubs, sports, and outdoor leisure. This approach helps avoid conflict and broadens the child's range of interests.

Equally important is a trust-based dialogue. Regular discussions about social phenomena, or reflections on cartoons, games, or news videos foster in the adolescent the capacity to analyse information and to express personal opinion. Such a strategy not only strengthens the bond between parents and children but also develops critical thinking, which is indispensable in the digital age.

Thus, the internet environment encompasses both opportunities and threats for the moral and ethical upbringing of youth. Information oversaturation, the displacement of real communication by virtual, the influence of harmful resources, and manipulation of consciousness constitute serious challenges. The appropriate response must consist in parental attention, personal example, the development of critical thinking, and the provision of alternative leisure activities. Only under such conditions will children be able to preserve spiritual orientation and be prepared for meaningful life in the modern world.

Loss of Social Communication Skills

One of the pressing issues of contemporary moral and ethical education of children and young people is their isolation from real-life interaction. Excessive involvement in the virtual domain results in a decline in social competences essential for building healthy and trustworthy relationships. Adolescents increasingly replace face-to-face dialogue with online correspondence in social networks, expressing emotions through emojis and stickers, which hampers the development of empathy, the capacity to discern the interlocutor's mood, and the ability to engage in constructive communication.

Family circumstances play a crucial role in shaping the personality of a child. In families where harmony, mutual understanding, and attentiveness towards children are absent, a deficit of communication and support is often observed. Parents, absorbed by work and their problems, may overlook the emotional difficulties of adolescents. Consequently, children seek substitutes for real interaction in the virtual environment, where it is easier to conceal their vulnerability and shortcomings. However, such substitution cannot compensate for the lack of human warmth and ultimately results in even greater alienation.

The social environment in which a child's worldview and behaviour are formed is no less significant. Peer influence and the broader milieu may become decisive factors. If consumerism, aggression, and individualism prevail in society, it becomes difficult for an adolescent to maintain moral orientation. They tend to conform to the norms of their group, even when such norms contradict universal moral principles. Under these conditions, spiritual development often recedes into the background, giving way to the pursuit of status and external markers of success.

Particular attention should be given to the internet sphere, which exerts a colossal impact on the consciousness of children and adolescents. Social networks, video platforms, and blogs frequently promote behavioural models based on the cult of strength, violence, or easy gain. The propagation of destructive and immoral lifestyles engenders distorted perceptions of friendship, love, and morality among young people. Adolescents lacking sufficient critical thinking are easily influenced by such patterns, accepting virtual reality as the normative framework.

All these factors lead to a series of negative consequences. Foremost among them are problems of self-identification. Young people without clear moral reference points struggle to determine their place in society and to construct a stable system of values. This may manifest as heightened anxiety, insecurity, and a lack of life goals.

Another consequence is aggressive behaviour. The absence of spiritual guidelines and appropriate role models fosters an increase in conflict, cruelty, and antisocial conduct. Adolescents often replicate aggressive behavioural models from the internet or their environment without recognising their destructive repercussions.

Furthermore, diminished motivation for learning becomes a significant outcome. Lacking an understanding of the meaning of knowledge and its role in life, pupils lose interest in education as a value in itself. Schooling is increasingly perceived merely as a formality required to obtain a certificate or diploma, rather than as a pathway towards development and self-realisation. This undermines prospects for personal growth and reduces the competitiveness of the younger generation in the future.

Addressing this problem requires a concerted effort by parents and educators in the sphere of social and moral education. It is essential to build a unified system of aims and objectives, directed not solely towards academic achievement but also towards the child's spiritual development. Parents should devote more attention to direct communication, discussions of values, and real-life situations, while educators should foster children's skills of critical information appraisal and the ability to distinguish genuine values from superficial ones.

Equally important is counteracting the pernicious influence of the internet environment. The creation of positive media content, the development of children's and youth communities where mutual respect, creativity, and cooperation are valued, can compensate for the aggressive atmosphere of virtual culture.

Thus, isolation from real communication and the accompanying difficulties in moral and ethical education constitute a serious challenge of the present era. This problem can only be resolved through the unification of family, school, and society as a whole. Only through collective endeavour is it possible to educate a generation that is not only technologically proficient but also spiritually mature, capable of harmonious relationships and responsible engagement in shaping the future.

Loss of Cultural Sensitivity: Xenophobia and Tolerance

The problem of shaping moral and ethical attitudes among schoolchildren within a multi-ethnic state is among the most urgent tasks of contemporary pedagogy and sociology. In the context of globalisation and dynamic migration processes, educational institutions face the necessity of preparing the younger generation for life in a multicultural environment, where

respect for other cultures and the capacity for intercultural dialogue are not merely desirable qualities but vital competences. The perception of other cultures by schoolchildren is a complex psycho-hygienic process, largely determined both by family upbringing and by the purposeful work of schools. Insufficient intercultural literacy may result in stereotypical thinking, prejudice, and, in extreme cases, xenophobia and nationalism. Hence, moral and ethical education in this aspect should focus on cultivating empathy, tolerance, critical thinking, and, above all, an awareness of the universality of human values despite cultural differences.

A key instrument in this process is not only the provision of information about the cultures of other peoples but also the creation of conditions for active interaction and immersion in their specificities. This may be implemented through the inclusion in curricula of elements of cultural studies, history, and literature of the peoples residing within the state, the organisation of joint creative and sporting events, as well as the establishment of discussion clubs where schoolchildren can address acute issues of intercultural interaction in a safe and respectful atmosphere. It is important to emphasise that such an approach should not be reduced to formal instruction but should permeate the entire system of school life, from extracurricular activities to daily communication. Special attention should be devoted to fostering pupils' skills of reflection and self-analysis, enabling them to critically assess their prejudices and stereotypes.

Recent research in pedagogy and psychology confirms that the most effective methods are those grounded in the principles of dialogue, cooperation, and a learner-centred approach. The paradigm of authoritarian teaching, in which the teacher acts as the sole bearer of truth, proves largely ineffective in this context. Conversely, cooperative pedagogy, where pupils function as active subjects of the educational process, allows them not only to assimilate information but also to experience intercultural interaction at a personal level. This experience, reinforced by emotional engagement and reflection, forms the basis for the development of stable moral and ethical convictions. Thus, the task of the school is not merely to instruct but to educate citizens of a multinational society, capable of constructive dialogue and intercultural cooperation, which in turn ensures the stability and prosperity of the state.

An equally important aspect is the involvement of pupils' families in the educational process, as it is within the family that fundamental values and attitudes towards the surrounding world are instilled. Schools may act as a bridge between diverse cultural groups by organising joint celebrations, festivals, and parent meetings, where representatives of different ethnicities may share their traditions and customs. This not only broadens pupils' horizons but also helps to overcome stereotypes among adults, thereby creating a more favourable environment for child-rearing. Ultimately, the moral and ethical education of schoolchildren with regard to their perception of other cultures in a multi-ethnic state is a continuous, complex, and multi-level process requiring the joint efforts of educators, parents, and society at large. Its success depends on our ability to instill in the younger generation not only respect for foreign traditions but also a profound understanding that humanity, kindness, and mutual assistance are universal values uniting all people irrespective of their national and cultural affiliation.

Crisis of Authority

The 21st-century society is experiencing a profound crisis of authority, which directly affects the moral and ethical upbringing of children and adolescents. Traditional reference

points are losing their significance, while new value systems have not yet acquired a solid foundation. This results in the deformation of the worldview of the younger generation and poses serious challenges for the family, school, and state.

The erosion of moral reference points has become one of the most evident problems. Under conditions of rapid social change, new attitudes and values have emerged, often imposed by external circumstances or the media. Young people acquire unfamiliar criteria for assessing actions, phenomena, and processes. This leads to a shift in value orientations, the weakening of previously established convictions, and the loss of a clear worldview framework in which concepts of good and evil, justice and injustice can be distinguished.

The weakening of the family's educational function exerts a significant influence on the younger generation. It is within the family that the child should receive the first notions of morality, responsibility, and spiritual values. However, social stratification, rising unemployment, and the disruption of traditional family structures increasingly undermine the capacity of parents to act as genuine mentors. Parents preoccupied with subsistence issues often withdraw from the educational process, leaving the child to seek answers to vital life questions independently. As a result, adolescents are deprived of stable support in the form of the authority of their elders.

No less palpable is the influence of the mass media. Streams of content disseminated through television, the internet, radio, and the press frequently propagate behavioural models far removed from moral ideals. The cult of ease, aggression, consumerism, and permissiveness captivates adolescents' attention, instilling false notions of what constitutes normality. The virtual sphere becomes a kind of "school of life", where instead of traditional moral values dubious reference points are promoted.

Youth subcultures occupy a particular place in the formation of worldviews. While they may provide adolescents with a sense of belonging and support, they often become sources of alienation from generally accepted values. Within certain subcultures, behavioural stereotypes are established that position young people in opposition to society, encouraging the narrowing of interests and the rejection of any authorities inconsistent with the group's values. Adolescents begin to disregard the advice of parents, teachers, and elders, concentrating solely on the rules of their subcultural environment.

Another acute problem is the lack of obedience and respect towards parents. The foundation of harmonious family relations lies in mutual understanding, yet it is precisely this that is frequently lacking in modern families. Parents and children "speak different languages", possessing divergent systems of values and views of life. As a result, adolescents lose trust in parental experience and increasingly seek authority among peers or in virtual spaces. This disrupts the so-called intergenerational bond and further exacerbates the crisis of moral orientations.

Thus, all the aforementioned problems are interrelated and create a complex situation in which it becomes ever more difficult for the younger generation to find reliable reference points. Addressing this situation requires the development of new approaches to defining the priorities of civic, moral, and patriotic education. It is necessary to strengthen the family as a fundamental institution, to establish in the educational system conditions conducive to the development of stable moral values among schoolchildren, and to create a positive media environment that

promotes examples of virtue, respect, and responsibility. It becomes evident that only comprehensive measures will enable the upbringing of a generation capable of preserving the spiritual wealth and resilience of society in the face of contemporary challenges.

Disregard for Historical Continuity between Generations

Disregard for historical continuity between generations represents one of the most acute challenges of contemporary moral and ethical education of children and young people in Russia. This issue is manifested not only at the levels of culture and education but also in the spiritual condition of society as a whole. Continuity has always played a crucial role in personality formation: the older generation transmitted life experience, accumulated knowledge, and values, while the younger generation assimilated them, adapting to new circumstances. Today, however, this natural process has been disrupted, leading to grave consequences.

The younger generation is deprived of the opportunity to emulate elders endowed with life wisdom and experience. Adolescents and young people often have little understanding of the principles by which their forebears resolved life's difficulties, nor of the moral reference points that helped them to preserve dignity, cohesion, and inner strength. The absence of such knowledge renders young people more vulnerable to the challenges of the time and less resilient in the face of crises and temptations.

Children's perceptions of such fundamental moral categories as kindness, compassion, justice, civic-mindedness, and patriotism are gradually distorted. These notions lose their profound significance and are transformed into abstract terms, divorced from everyday life. As a result, adolescents are deprived of a solid moral foundation that would enable them to navigate complex situations, make responsible decisions, and build harmonious relationships with others.

The situation is further aggravated by the fact that young people increasingly orient themselves towards the parameters of mass culture, predominantly Western. External attractiveness, the cult of success, and consumerism frequently replace the values of spirituality and national tradition. Adolescents aspire to conform to models projected by the media, fashion, and the internet, while simultaneously losing connection with the cultural and historical heritage of their country. This results in a crisis of identity and a weakening of the sense of belonging to their people.

The reasons for the disregard of historical continuity between generations are largely associated with the disintegration and crisis of the family. Many contemporary parents themselves lack a sufficient level of moral and spiritual culture and, therefore, are unable to transmit it to their children. Often there is no understanding that upbringing requires not only the provision of material needs but also careful attention to the child's inner world. When parents are incompetent in matters of spiritual and moral development, children grow up without stable moral guidelines.

Another serious cause is the dominance of material values over spiritual ones. Contemporary society actively disseminates the idea that success is measured by wealth, possessions, and social status. Against this background, the values of honour, duty, responsibility, and service to society appear outdated and insignificant. Consequently, a consumer-oriented personality type is formed, for whom spiritual reference points are relegated to the periphery.

Addressing this problem requires a comprehensive approach. It is essential that state policy in the sphere of moral education of the younger generation be built on the principles of interconnectedness, interdependence, and continuity of generations. Programmes must be developed that will enable young people to familiarise themselves with their historical heritage, revive traditions of respect for elders, and foster an interest in national culture. Educational institutions should play a significant role in this process, as they are obliged not only to provide knowledge and professional skills but also to cultivate spiritual values in children.

Special attention must be paid to the family as the primary and most important institution of upbringing. Educators and social services should work with every family, explaining the importance of preserving and transmitting family traditions and supporting dialogue between generations. Only in an atmosphere of trust, respect, and continuity can a harmonious personality be formed, prepared to assume responsibility for oneself, one's family, and society.

Thus, the problem of disregarding historical continuity between generations is not merely a pedagogical but also a social challenge. Its resolution requires the concerted efforts of the family, the school, and the state. Only by restoring the living connection between past and present can a generation be nurtured that is capable of preserving spiritual values and developing society on the basis of moral ideals.

Examples of Problematic Situations

Situation 1: Cyberbullying and Online Aggression

The case of cyberbullying in one of Moscow's schools vividly demonstrates the serious challenges of contemporary moral and ethical education of schoolchildren. In Year 8, a group of pupils created a chat in a social network, where they systematically ridiculed and humiliated a female classmate because of her appearance and her family's financial situation. The girl concealed what was happening from adults for a long time, which led to the development of anxiety, depressive states, and instances of self-harm. This case illustrates how rapidly and destructively negative manifestations can spread in the digital environment, where pupils often fail to recognise the consequences of their actions.

Cyberbullying differs from traditional school aggression in that aggressors remain anonymous, distanced, and shielded from the victim's immediate reaction, which reduces their sense of responsibility. As a result, a distorted understanding of behavioural norms is formed, where humiliation and cruelty are perceived as acceptable modes of interaction. Such a situation underscores the necessity of systematic efforts by both schools and families to cultivate in children's skills of empathy, respect for others, and conscious conduct in online spaces.

In addition to direct harm to the victim, cyberbullying adversely affects the overall atmosphere within the peer group, disrupts trust-based relationships among classmates, and intensifies fear in other pupils. Effective resolution of the problem requires not only educational measures but also psychological support for victims, awareness-raising for parents and teachers regarding the risks of online aggression, and the implementation of digital ethics programmes. This approach contributes to the formation of stable moral guidelines among schoolchildren and enhances their sense of responsibility for their actions in both real and virtual spaces.

Situation 2: Value Conflict in a Multinational Classroom

In a school with a multinational student body, a conflict emerged between children from different cultural traditions. Some pupils refused to participate in school events dedicated to folk celebrations of other cultures, referring to their religious beliefs. This led to the emergence of hostile groups and a rise in interethnic tension.

Such situations provide fertile ground for the creation of antagonistic groups, where each ethnic or cultural community seeks to defend its values and traditions, often coming into contradiction with others. Within the classroom, a conflict arises between the aspiration for collective integration and the preservation of individual cultural identities, which negatively influences the moral and ethical development of children. Pupils raised in such conditions risk internalising behavioural models based on intolerance and prejudice.

Addressing this problem requires deliberate efforts by teachers and school administration to establish an environment in which respect for cultural and religious diversity is harmonised with common moral principles. The development of intercultural communication skills, the fostering of tolerance, and the engagement of parents in the process help to minimise conflicts and contribute to the harmonisation of pupils' value orientations.

Situation 3: Consumerist Attitude towards Education

In senior classes of many schools, there is a noticeable tendency towards the formation of an exclusively consumerist attitude towards education. For a significant proportion of pupils, school ceases to be a place for personal development and the acquisition of knowledge, becoming instead a kind of "service" to be obtained formally. Pupils often demand high grades regardless of their actual knowledge or effort, perceiving marks not as a reflection of work accomplished and skills acquired but as an inalienable right.

This approach undermines respect for the teacher, who begins to be perceived not as a mentor and guide to the world of knowledge but as service staff obliged to satisfy the demands of pupils and their parents. Such an attitude fosters a distorted understanding of the educational process: the value of effort, perseverance, and self-development is replaced by the expectation of easy results without exertion.

As a result, the principal meaning of schooling—the education of a responsible, reflective, and morally mature individual—is lost. A consumerist attitude diminishes motivation for learning, hinders the development of cognitive interest, and deprives children of the ability to value knowledge as the foundation for future achievements and life success.

Discussion

The results of the conducted study demonstrated that the moral and ethical education of schoolchildren in contemporary Russia constitutes a complex problem arising from a number of interrelated factors. The principal findings of our research confirm the general trends identified in both domestic and international academic literature, while simultaneously providing clarifications specific to the Russian context. In particular, we established that the key challenges—namely, the weakening of the educational function of the family, the negative influence of the digital environment, and the crisis of authority—are not isolated phenomena but are closely intertwined, thereby creating a systemic crisis in the formation of moral orientations among the younger generation.

The conclusions obtained regarding the predominance of a consumerist attitude towards education and the loss of social communication skills are reflected in the works of Russian scholars (*Tkachenko & Natalich, 2018*; *Khomushku, 2015*), who also note a decline in motivation for learning and the erosion of value orientations. However, unlike many classical pedagogical approaches (*Ivanov, 2021*; *Karakovsky et al., 2020*), which focused on collective forms of education, our study highlights the growing individualisation and atomisation of society, which necessitates new, more targeted pedagogical strategies. Particular attention should be given to our finding concerning the neglect of historical continuity between generations, which leads to the loss of national and cultural identity. While foreign research (*Arthur, 2021*; *Munawarsyah et al., 2022*) actively advances the concept of character education aimed at the cultivation of universal virtues, in Russia these approaches must be adapted with consideration for the spiritual and moral heritage and traditional values.

The theoretical significance of our research lies in its provision of a comprehensive analysis of the problems of moral and ethical education under the conditions of a digital society and in its proposal of systemic solutions that integrate the efforts of the family, school, and wider society. Its practical significance resides in the development of concrete recommendations for teachers and parents regarding the cultivation of digital hygiene, empathy, and critical thinking skills among schoolchildren. The proposed measures, such as social project work and volunteering, may serve as the foundation for effective programmes aimed at counteracting negative tendencies.

The relevance of this research in Russia is evident in the necessity of conducting large-scale empirical studies that would allow for the quantitative assessment of the impact of various factors (internet addiction, media content, family climate) on the moral and ethical development of schoolchildren. It is also important to examine how value orientations differ depending on region of residence, cultural environment, and socio-economic status of the family.

Based on the conducted research, we propose the following topics for further study in the academic community:

1. Comparative analysis of the effectiveness of Russian and foreign models of moral and ethical education: it is necessary to conduct a comparative study of approaches such as character education and traditional Russian educational systems in order to identify their strengths and weaknesses.
2. The influence of digital tools on the formation of morality: an in-depth study is required to examine how interactive platforms, online games, and social networks affect adolescents' ethical perceptions, as well as the development of methods for preventing destructive behaviour in the virtual environment.
3. Development and testing of intercultural education programmes: it is essential to design and pilot educational programmes aimed at cultivating tolerance and respect for cultural diversity in multi-ethnic classrooms.
4. The role and position of the teacher-mentor in the context of digital transformation: it is necessary to investigate how the role of the teacher is changing in the modern world and which competences are required for effective moral and ethical education.

5. Examination of the impact of family upbringing during the pandemic and post-pandemic period: an analysis is required of how isolation and the transition to distance learning have affected family relationships and, consequently, the moral development of children.

Such studies will not only facilitate a deeper understanding of the issue but also contribute to the development of new, more effective strategies for addressing the challenges of moral and ethical education in the conditions of modern society.

Conclusion

Modern moral and ethical education of schoolchildren constitutes a complex and multifaceted problem, the resolution of which requires profound rethinking and a systematic approach on the part of all social institutions. The conducted research has made it possible to identify the key challenges faced by the family, the school, and society in the era of digitalisation and global transformations. Among the most pressing issues are the shift in the value orientations of the younger generation, the weakening of the educational function of the family, the negative influence of the media and the Internet, the loss of social communication skills, the crisis of authority, and the disruption of historical continuity between generations. These factors, being closely interrelated, form a complex threat to the harmonious development of the individual, rendering children and adolescents vulnerable to destructive phenomena.

In particular, the analysis has demonstrated that the weakening of the family's role, caused by the high level of parental employment and the shift in priorities, results in a deficit of attention and emotional connection. Consequently, children are deprived of essential support and stable moral reference points, seeking them instead in the frequently hazardous and anonymous online environment. The influence of mass media and internet addiction exacerbate the situation, contributing to the spread of aggression, consumerist values, and distorted conceptions of the norm. Practical examples, such as cyberbullying and the consumerist attitude towards education, vividly illustrate that without targeted work aimed at forming spiritual foundations, society risks producing a generation incapable of empathy, responsible behaviour, and constructive interaction.

Addressing these problems necessitates a systemic approach that unites the efforts of the family, school, and society into a single educational environment. The most effective solutions proposed include:

1. *Strengthening cooperation between family, school, and society*: the creation of a unified educational environment founded on trust and mutual understanding. This will not only synchronise educational efforts but also help parents realise their crucial role in shaping children's moral values.
2. *Developing emotional intelligence and empathy*: the integration into the educational process of programmes aimed at cultivating in schoolchildren the capacity for compassion, understanding the feelings of others, and engaging in constructive dialogue.
3. *Teaching digital literacy and ethics*: the formation in children of skills of critical thinking, conscious consumption of information, and responsible behaviour in virtual space. This is a key element in countering the negative influence of the Internet and cyberbullying.

4. *Social project work and volunteering*: involving schoolchildren in practical activities that enable them to apply moral principles in practice, to feel their belonging to society, and to appreciate the value of helping others.
5. *Supporting teachers and their professional development*: strengthening the role of the teacher as a bearer of moral values and creating conditions for professional growth in the field of educational technologies.

Thus, the resolution of problems in moral and ethical education is not merely a pedagogical task but a nationwide priority, upon the success of which the future of society depends. Sustainable development is possible only if society succeeds in shaping a generation capable not only of effectively adapting to contemporary challenges but also of remaining faithful to moral ideals, which constitute the foundation of a strong, cohesive, and resilient society. The adoption of these measures will not only compensate for the negative impact of the external environment but will also harness the vast potential of education and digital technologies for the comprehensive development of the individual. Only through joint efforts will it be possible to nurture citizens with a high level of moral self-awareness who are prepared for the responsible construction of their future.

Conflict of Interest

The author declares that there is no conflict of interest.

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Anastasiia Yu. Mariach [a][7]

Fostering Students' Independence in the Context of Musical-Instrumental Training at a Pedagogical University [6]

Abstract:
A teacher is a person of the future. The profession itself and the specific nature of pedagogical activity presuppose the ability to look slightly ahead and to hypothetically forecast potential developments. The study aims to develop and substantiate an algorithm for cultivating students' independence within the process of musical-instrumental training at a pedagogical university. The article systematises the views of teaching researchers on the problem of fostering independence in music-pedagogical education. The development of students' independence is considered as a factor that stimulates their artistic and creative thinking throughout the process of musical-instrumental training in a pedagogical higher education institution. The object of the study is the musical-instrumental training of students at a pedagogical university. The subject of the study is the process of fostering students' independence in the conditions of musical-instrumental training at a pedagogical university. The novelty of the study lies in revealing a close relationship between fostering students' independence and the level of their methodological literacy, which is reflected in the formation of professional competences related to understanding the auditory-technical processes of artistic instrumental performance and intoning, as well as the ability to differentiate, coordinate, and integrate sound-intonational, harmonic, polyphonic and reflective processes of perception and assimilation (comprehension and reinterpretation) directly during the performance of a musical work. The study demonstrates the immense significance of developing students' independence in shaping and advancing their piano-intonation culture as an integral component of the inner personal culture of future music teachers. The author concludes that fostering students' independence in the course of musical-instrumental training at a pedagogical university constitutes an essential component in forming musicians' professional readiness for pedagogical activity in educational institutions.

Keywords: theory of piano intonation, musical-instrumental training of students at a pedagogical university, fostering of independence, ways of stimulating the pianist's artistic and creative thinking, Soft Way to Mozart.

Abbreviations:

AL is advanced level,
CG is control group,
EG is experimental group,
IL is insufficient level,
IPC is intonational-pianistic complex,
MAL is the minimally acceptable level.

Introduction

An objective examination of the process of musical and instrumental training for prospective music teachers makes it possible to identify the key requirements for the quality of their professional preparation. These include the fostering perseverance and a strong work ethic,

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self-discipline and empathy, the development of motivational and volitional qualities, and an emotionally value-oriented attitude towards pedagogical activity. Equally important are the nurturing of artistic expressiveness and the enhancement of technical proficiency, as well as the formation of critical, artistic and creative musical thinking. Developing musical and emotional intelligence, alongside pedagogical and performance-based intoning, further defines the core competencies expected of future music educators.

The process of musical and instrumental training of a music teacher is exceptionally complex due to the fact that applicants to pedagogical universities for music-related programmes often have no basic professional musical education. Consequently, an extremely challenging task arises—to train competent music teachers within a short period of time. This means developing and refining the pianist's technique, cultivating a high level of performance mastery that enables the performer to convey the full beauty of music, shaping the students' worldview and way of thinking, and nurturing a creative personality capable of inspiring and "igniting" others through art.

The object of the study is the musical and instrumental training of students in a teacher-training university.

The subject of the study is the process of fostering students' independence within the context of musical and instrumental training in a teacher-training institution.

The study aims to develop and substantiate an algorithm for fostering students' independence within the process of musical-instrumental training at a pedagogical university.

According to the purpose, the study addresses the following tasks:

- examine the theoretical and methodological dimensions of fostering independence within music-pedagogical education;
- develop and test, through a pedagogical experiment, an algorithm for fostering students' independence in the context of musical and instrumental training in a teacher-training institution.

The practical significance of the study lies in the potential application of its findings in the professional practice of music teachers across various levels of musical and music-pedagogical education.

Methods

The research methodology is determined by the practice-oriented significance of the examined topic in music and pedagogical education. In preparing the study, the author relies on the systemic (*Salakhova, 2025*), competency-based (*Ivonina, 2016*; *Shubovich, 2009*), and learner-centred (*Gessen, 2018*; *Shubovich, 2009*) approaches to organising the educational and upbringing process in musical and instrumental training. The key principles of the identified pedagogical approaches are revealed in classes on musical and instrumental training through the process of joint cultural creativity (culture's perception—culture's understanding—culture's creation) between teacher and students (*Kobozeva, 2012*; *Kornoukhov, 2011*); in conceptualisations of pedagogical activity as an art (*Ivonina, 2016*); in the organisation of musical and instrumental lessons for students based on learning through active performance (*Barinova, 2002*; *Kornoukhov, 2011*; *Kremenstein, 2009*; *Mariach, 2023a*; *Shchapov, 2009*; *Tselkovnikov, 1999*; *Tsypin, 2021*), in the transformative and exploratory nature of musical activity (*Kornoukhov, 2011*); in the search for

personally meaningful values (*Gessen, 2018*; *Ivonina, 2016*; *Shubovich, 2009*); and in fostering among students a value-based attitude toward their own work as teacher-musicians (*Shcherbakova, 2022*; *Shtennikova, 2011*; *Tselkovnikov, 1999*).

Within the framework of musical and instrumental training for students at a pedagogical university, the author implements:

- the technology of artistic intonation on the piano (*Malinkovskaya, 2005*; *Mariach, 2023b*);
- network-based interactive digital technologies;
- the *Soft Way to Mozart* programme by E.V. Khainer (I.B. Gorbunova, K.Y. Plotnikov, and E.V. Khainer) (*2020*).

The study presents:

- an analysis of scholarly and pedagogical literature addressing the development of independence among students of various musical specialisations (*Kremenstein, 2009*; *Shchapov, 2009*; *Sradzhev & Yu Ping, 2024*), which made it possible to examine different aspects of the research topic and to formulate the most effective pedagogical conditions for nurturing independence in the course of musical and instrumental training of pedagogical university students;
- methodological (*Barinova, 2022*; *Kremenstein, 2009*; *Shchapov, 2009*) and psychological-pedagogical (*Petrushin, 2025*; *Toropova, 2019*) analysis of the process of artistic piano intonation in the context of the ideas of biomechanics (*Asmolov, 2007*; *Bernstein, 1997*), physiology of activity (*Shulpiakov, 2016*), methodology of piano instruction (*Barinova, 2022*; *Shchapov, 2009*; *Tsypin, 2021*), and theory of piano intonation (*Blaginina, 1995*; *Malinkovskaya, 2005*; *Mariach, 2023b*);
- pedagogical observations of the course and content of the pedagogical experiment conducted within the conditions of musical and instrumental training at a pedagogical university (*Abdullin & Nikolaeva, 2020*; *Blaginina, 1995*; *Mariach2023a*);
- diagnostic tools (criteria and indicators) for determining the levels of students' independence development in the process of musical and instrumental training at a pedagogical university (*Blaginina, 1995*; *Mariach, 2023b*; *Tselkovnikov, 1999*);
- analysis of statistical data from diagnostic results in determining the levels of independence development during musical and instrumental training of pedagogical university students.

Literature Review

The question of how to nurture an independently thinking student has always attracted the attention of scholars and practising educators. Various aspects of developing independence in music pedagogy have been explored by many researchers, including B.L. Kremenstein (*2009*), A.P. Shchapov (*2009*), V.P. Sradzhev & Yuĭ Pin (*2024*), etc. The cultivation of independence as an essential component of musical and instrumental training (lessons within the instrumental performance class) has been addressed in the works of M.N. Barinova (*2002*), B.M. Tselkovnikov (*1999*), M.D. Kornoukhov (*2011*), G.L. Knyazeva (*2015*), etc. The specificity of musical instruction and the psychological and pedagogical dimensions of fostering independence among students at various levels of music and music-pedagogical education, in the context of the psychology of musical activity, are discussed in the studies of V.I. Petrushin

(*2025*), A.V. Toropova (*2019*), etc.

Practising educators generally agree that the principal reasons for the absence or insufficient development of independence among students include:

- certain deficiencies in the methodology and organisation of instrumental-performance teaching by the instructor;
- the students' lack of a specific set of professional knowledge (an understanding of the fundamentals of biomechanics and physiology of activity, the theory of artistic intonation, and the psychological and pedagogical aspects of performance) and performance skills (the ability to differentiate, coordinate, and integrate acquired knowledge during personal performance);
- the insufficient development of specific musical abilities (sense of musical time, metre-rhythm, intonational musical hearing, memory, thinking, and imagination), all of which directly influence the development of independence during musical and instrumental training (*Gorbunova et al., 2020*; *Kremenstein, 2009*; *Petrushin, 2025*).

B.L. Kremenstein emphasises that the process of nurturing independence is directly linked to the maturity and autonomy of students' thinking. In this regard, the most convincing interpretation of the category *independence* is that offered by V.P. Sradzhev and Yu Ping, who define it as "the learner's ability to perform educational activities successfully without direct assistance and supervision by the teacher." (*Shchapov, 2009, p. 68*) The researchers identify the main areas of a musician's training that are directly related to the cultivation of mature and independent thinking: technical development, accumulation of musical repertoire, musical-artistic development, and the formation of the musician's creative personality (*Shchapov, 2009, p. 39*).

The methodological and technological aspects of teaching in musical and instrumental training (piano) are examined in the works of M.N. Barinova (*2022*), A.P. Shchapov (*2009*), B.L. Kremenstein (*2009*), G.M. Tsypin (*2021*), M.D. Kornoukhov (*2011*), B.M. Tselkovnikov (*1999*), etc. An analysis of these studies shows that a decisive influence on the development of independence comes from deliberate work aimed at forming in students an understanding of the principles of artistic intonation at the piano, and at developing an auditory-technical connection between inner intonational and sonic imagery and its expression through performance motion and gesture. In this context, the study of the theory of piano intonation, certain principles of biomechanics and the physiology of personal activity, the kinetics and kinesthetics of performance motion and gesture, as well as the acquisition of fundamental methodological concepts of piano performance (activity and passivity in performance, pressure and strike, intonational points of support, etc.), and conceptions of weight distribution during piano playing, are particularly important.

Equally essential is the cultivation of an understanding of the aesthetic beauty of correct posture at the instrument, work on the flexibility, freedom, and elasticity of the hands, and training in performance breathing and the quality of improvisational freedom of intonation. O.F. Shulpyakov emphasises the need to foster creative, constructive thinking in students. The foundation of independence, the researcher notes, lies in the knowledge and ability to "practise correctly and effectively" (*Shulpiakov, 2016, p. 28*).

Research in the field of music psychology notes that fostering independence is one of the

key factors determining the professional success of future music teachers (*Petrushin, 2025*). A musician's independence is based on self-discipline, freedom (tempered by self-restraint), autonomy and boldness, a conscious choice of one's creative path, tireless artistic pursuit, intellectual curiosity, the ability to anticipate results, model the performance process, intuition, and knowledge of how to solve specific tasks. The cultivation of independence is closely connected with mastering psychological self-regulation (including emotional and motivational-volitional aspects) and developing such volitional traits as determination, composure, persistence, flexibility, and purposefulness.

Active transformative and exploratory activity, grounded in the implementation of an affective-cognitive learning strategy, exerts a profound influence on the development of students' independence, and on the formation of their intellectual maturity and awareness (*Shcherbakova, 2022, p. 44*). Ideally, musical and instrumental training is an art form—a creative collaboration between teacher and student. It is precisely these factors that are highlighted in the works of L.F. Ivonina (*2016*), B.M. Tselkovnikov (*1999*), M.D. Kornoukhov (*2011*), and E.G. Shtennikova (*2011*).

One of the ways to cultivate independence as a personal quality in students within the process of musical-instrumental training in a pedagogical university is through working with the modules of the programme *Soft Way to Mozart*—a unique research-based development by the contemporary scholar, musicologist, and educator Elena Vladimirovna Khainer (Nikolaeva) (*Gorbunova et al., 2020*). The effective organisation of the educational and pedagogical process in musical-instrumental training is possible only through the integration of science and art and the convergence of tradition and innovation.

Results

Theoretical Aspects of Fostering Learners' Independence in the Process of Music-Instrumental Training at a Pedagogical University

When speaking of piano performance creativity, it is evident that today it has, regrettably, somewhat lost its former popularity. This is attributable to several factors.

Firstly, there is often no direct indication of the programme and content that convey the idea and underlying concept of a musical work. As a consequence, the intonational meaning of music becomes partially obscured, since, at a minimum, the performer must comprehend the analytic-grammatical and intonational-dramaturgical features involved in shaping instrumental music.

Secondly, the complex system of fingering principles required for performing particular textures or figuration patterns renders the process of reading musical notation a highly challenging and problematic task.

Thirdly, certain difficulties are associated with understanding the physiology of muscular sensations: developing the sensitivity of the fingertips' touch, awareness of piano kinetics and kinaesthetics, cultivating the plasticity of performing movements and gestures, mastering artistic and poetic pedalling, and acquiring various types of performing techniques (positional playing; the "pearly playing" *jeu perlé*—an extremely light touch, airborne sound, skills in performing five-finger classical and extended Romantic passages and figurations within a single unified hand

movement; the "fresco (weight-based) playing"—a system of gravity and the concept of distributing weight load among the fingertips during performance, the skill of "contact" and "grip" with the keyboard). This also involves differentiation, coordination, and coherence of muscular sensations, as well as the correlation of the intonational process with the performer's artistic and creative thinking. All the above (and more) must be supported by mastery of knowledge in the field of musical articulations, phrasing, and declamation, together with skills of artistry, persuasiveness, stylistic accuracy, and the artistic expressiveness of piano intonation.

Thus, instrumental performance is a highly complex, intellectual, and multifunctional process that requires the simultaneous perception, comprehension, and interpretation of music in both diachronic (temporal, sequential) and synchronic (integrated, systemic) dimensions. Of particular interest is B.L. Kremenstein's approach to fostering learners' independence in the instrumental performance class through the active incorporation of the dialectical method for analysing the regularities and contradictions (*Kremenstein, 2009*) of various issues arising in piano performance. The ability to identify a problem, or part of it, represents a small yet essential step towards its resolution. In A.P. Shchapov's research, a number of specialised musical skills have been identified as directly influencing the development of learners' independence:

- *preliminary, intermediate and final reflection* on the performance of a musical work, enabling the student to mentally analyse their own playing either before its actual embodiment at the piano, or between repeated rehearsal renditions, or after performing the work. This makes it possible to comprehend particular complexities of artistic intoning, choose appropriate playing techniques and working methods, overcome performance difficulties, identify unsuccessful elements, and determine further directions for improvement;
- the *immediate realisation of the intended artistic idea* without numerous trials and errors, which promotes the development of self-control, self-discipline, greater manageability of the performance process, and the ability to subordinate the progression of instrumental performance to the performer's creative will;
- the *instant implementation of spontaneously arising artistic and creative impulses* in the musician's consciousness;
- the *continuous self-improvement of intoning quality*;
- the *simplification of technical tasks*;
- the *habit of playing with a "beautiful sound"*, with accuracy, assurance, meaningfulness and artistic expressiveness (*Shubovich 2009, pp. 70–78*).

Thus, the significant factors determining the success of fostering independence among students within the context of musical and instrumental training have been identified, namely:

- understanding the analytical-grammatical and intonational-dramaturgical features of musical form development;
- mastery of the system of fingering principles and figurational formulas;
- understanding the physiology of activity and the biomechanics of the performing process;
- command of knowledge in the field of musical articulation, phrasing, and declamation;
- formation of personal performance qualities (artistry, persuasiveness, stylistic fidelity, artistic expressiveness);
- differentiation and coordination of all aural-technical processes of thinking and

performing-intoning in the course of the simultaneous perception, comprehension, and interpretation of music in both diachronic and synchronic dimensions.

Development and Testing of an Algorithm for Fostering Student Independence within the Framework of Musical-Instrumental Training at a Pedagogical University during a Pedagogical Experiment

Drawing on a comprehensive theoretical and methodological analysis of scholarly pedagogical literature, the author formulates a set of pedagogical conditions for fostering independence in the context of musical-instrumental training at a pedagogical university:

1. The development in students of an understanding of the content of music: immersion in the artistic-semantic, genre-stylistic, and piano-stylistic context of the musical work.
2. Learners' acquisition of the technology of artistic intoning at the piano: mastery of the motor-technical components of the intoning process (texture-piano formulas, types of performance movements, fingering principles, types and techniques of touch), as well as the development of holistic artistic perception of music through the study of notational detail.
3. Work within the modules of the *Soft Way to Mozart* programme in accordance with the educational and didactic materials and plans developed by E. V. Khainer.

Independence is formed gradually throughout the learning process, absorbing methodological principles of piano instruction; it appears to "grow from within" on the basis of accumulated knowledge, experience, responsibility, and self-discipline. The fostering of independence occurs from lesson to lesson through the personal example set by the teacher and through the planning of goals and the strategic combination of long-term and immediate tasks within the musical-educational process of instrumental training at a pedagogical university.

The author proposes the following algorithm for fostering student independence in the conditions of musical-instrumental training at a pedagogical university.

1. *Step One*. Organisation of the learning process: a system of exercises aimed at strengthening and relaxing the performing apparatus (shoulder-girdle gymnastics such as "Arm Swings", "Posture", relaxation exercises such as "Pendulum", "Rolling Ball", "Five Fingers", etc.), and the acquisition of principles of aesthetic posture at the piano.
2. *Step Two*. Mastery of the technology of artistic intoning at the piano. Learners acquire a method of critical analysis of their performance in the context of ideas drawn from biomechanics, the physiology of activity, and the theory of piano intoning: identifying and overcoming performance difficulties; developing an understanding of the work of the muscular-ligamentous apparatus; achieving control and awareness during intoning; selecting appropriate performance movements and gestures; developing flexibility, freedom, and elasticity of the hands, which directly affects tone quality.
3. *Step Three*. Introduction to the principles of the theory of piano intoning: (a) components of the IPC; (b) immersion into the artistic-semantic, genre-stylistic, and piano-stylistic context of a musical work; (c) mastery of the motor-technical components of the IPC (texture-piano formulas, performance movement forms, fingering principles, types and techniques of touch); (d) achievement of holistic perception based on the study of notational detail; (e) conceptualisation of the musical work; (f) work on interpretation.

Learners acquire essential qualities of performance intonation, such as playing and music-making, improvisation, a sense of measure and freedom within self-limitation, and familiarity with heuristic and canonical traditions of performance across cultural-historical styles and periods. Mastery of artistic-pedagogical analysis of musical works is also fostered, aimed at identifying the idea of a composition and determining pedagogical tasks related to the acquisition of artistic intoning.

4. *Step Four*. Improvement of music-reading skills through the Soft Way to Mozart programme while working in the modules "Gentle Piano" and "Note Alphabet".

To verify the developed algorithm for fostering student independence in the context of musical-instrumental training at a pedagogical university, a pedagogical experiment was conducted by the author from 2018 to 2025 at the Department of "Music and Methods of Teaching Music" of Penza State University.

More than 50 students participated in the pedagogical experiment. All were enrolled in the Master's degree programme *44.04.01 Pedagogical Education*, specialising in *Musical Art and Education*.

At the diagnostic stage of the pedagogical experiment (September 2018–2025), a sociological study was conducted. A series of pedagogical interviews were carried out with approximately 20 respondents from among music-pedagogy professionals. The following results were obtained.

All respondents (100%) emphasised the necessity of preparing students for subsequent independent practical pedagogical work. However, they noted that achieving this is often challenging due to the enormous informational overload and oversaturation of educational programmes with disciplines from diverse fields of knowledge, the lack of classroom hours allocated to instrumental training in music-oriented pedagogical programmes, and students' limited time for independent practice, as many of them simultaneously study and work.

Music teachers agreed that the successful fostering of independence requires equal attention to the development of emotional-sensory and cognitive intelligence. Emotions and rationality constitute "the principal driving forces in a musician's work" (*Kremenstein, 2009, p. 7*).

The sociological interviews revealed that the success of fostering independence depends equally on the learner's abilities and individual qualities and on the pedagogical talent of the music teacher—the ability to intuitively and consciously perceive the temperament and character of learners, maintain flexibility and adaptability, model pedagogical situations in a timely manner, and objectively assess the students' abilities and performance.

Respondents stressed that teaching activity is inseparable from educational tasks aimed at fostering awareness, perseverance, and resourcefulness in work, fostering stable self-discipline and self-control combined with creativity, heuristic discovery, and active artistic exploratory activity during lessons.

To evaluate the success of implementing the author's algorithm and assess its effectiveness within the musical-instrumental training of students at a pedagogical university, a criteria-based assessment system for evaluating the effectiveness of fostering independence was designed at the diagnostic stage of the pedagogical experiment, presented in the *Table 1* below.

Table 1. Assessment System for Evaluating the Effectiveness of Fostering Independence in Musical-Instrumental Training Sessions at a Pedagogical University

Assessment Criteria	**Indicators for Evaluating the Effectiveness of Fostering Independence**
Readiness for professional pedagogical activity as a music educator	Knowledge and understanding of the auditory and technical processes of artistic performance-instrumental intonation, as well as the ability to differentiate, harmonise, and coordinate sound-intonational, harmonic, polyphonic, and reflexive processes of perception, comprehension (interpretation and reworking) directly within the process of performing a musical composition.
Mastery of knowledge concerning the specific features of organising musical and instrumental training for students and learners across different age groups.	Proficiency in the pedagogical technology of artistic instrumental-performance intonation, alongside the practical skills required for working with the *Soft Way to Mozart* programme.

Based on the criteria and indicators developed, the author of the study identified two levels of effectiveness in fostering students' independence within the context of musical-instrumental training at a pedagogical university: the AL, the MAL, and the IL.

The AL of effectiveness in fostering independence among students at a pedagogical university is characterised by the confident operation of knowledge of musical art within the broader framework of world culture; a profound understanding of the traditions of music-pedagogical education; knowledge of and correlation with the fundamental tenets of the doctrine of intonation and intoning; and familiarity with selected principles of biomechanics and the physiology of personal activity in relation to the content of the educational and instructional process in musical training. It is also characterised by a fluent command of pedagogical methods for fostering a culture of piano intoning, as well as the network-based interactive digital technology for teaching music literacy, exemplified by *Soft Way to Mozart*; the ability to differentiate and coordinate the understanding of performance movements and gestures and auditory representations during one's own piano playing; and the capacity to coordinate and integrate the entire body of knowledge during piano performance-intoning.

The MAL of effectiveness in fostering independence among master's students at a pedagogical university is characterised by sufficiently sound mastery and orientation across the identified indicators, solid understanding of the key ideas of the doctrine of intonation and intoning, and consistency between its foundational principles and the content of the instructional and educational process in musical-instrumental training. It also presupposes a good foundational understanding of the psychological and pedagogical aspects of fostering independence as a factor that activates artistic, musical-creative thinking.

The IL is characterised by an underdevelopment of the indicators and criteria of independence among the students.

The instructional stage of the pedagogical experiment (2023–2025) was conducted at the Department of "Music and Methods of Teaching Music" of Penza State University. The experiment involved 20 part-time students, divided into two groups—EG and CG—with 10 students in each.

Initial diagnostics at the beginning of the instructional stage of the pedagogical experiment revealed an insufficient level of independence among the students (80% in EG and 60% in CG). Only 20% of students in EG and 40% in CG demonstrated a minimally acceptable level of independence; an advanced level was not identified among any participants at this stage of the experiment.

Based on the diagnostic results, the following musical works were proposed for study: F. Chopin—*Mazurkas* in E minor, Op. 17, No. 2; in A minor, Op. 17, No. 4; *Étude* in C sharp minor; *Nocturne* in C sharp minor; *Berceuse* in D flat major; F. Liszt—"Liebesträume", "Consolation" in D flat major; E. Grieg—*Butterfly*; P. Tchaikovsky—*Étude* in G major; S. Rachmaninov—*Étude-Tableau* "The Fair".

A Fragment of a Lesson in Musical-Instrumental Training. Pedagogical Étude "Butterfly"

Grieg's *Butterfly* is a romantic and emotional impulse. The piece is exquisitely performed by the distinguished Soviet pianist and pedagogue M. Grinberg. An artistic parallel may be drawn with A. Fet's poem "Butterfly".

Grieg portrays a vivid scene of a hot summer meadow filled with flowers. A butterfly first freezes on a petal (the piece opens with a melodic pause on a long note), then flutters upwards (passages) and moves to another flower, repeating this several times. The composer appears captivated by the beauty and delicacy of the butterfly. The piece functions as an impression—an intonation of play and improvisation. The performance involves diverse techniques: harmonic colours, rhythmic pauses, surges of melodic figurations, and enveloping pedalling. Although the tempo is *rubato*, this freedom functions within self-restraint, balanced by a sense of proportion and taste.

The primary task in mastering the miniature is work on performance movement and gesture. The long note resembles "planting a seed, which later blossoms into a beautiful flower"; the wrist seems to draw a circular motion on the sustained sound. In the melodic patterns, the task is to avoid heavy finger articulation, aiming instead for wrist-based *legato*. The piece embodies a capricious dialectic between moments of lingering on long notes and the upward striving of melodic figurations (the butterfly taking flight). The instrumental melody is highly pictorial and full of colour. Its tonal sphere conveys the butterfly's changeability and unpredictability. Music here becomes life in motion, with dynamics shaped by wave-like rises. The aura is one of summer, freedom, and improvisation.

The performance challenge lies in combining an improvisatory intonational awareness—instant emotional reaction, comprehensive grasp of the performance process, and automatism of hand movements (wrist, fingers)—with a controlled mastery of weight distribution (understanding intonational peaks, light passing tones, and the capacity to play passages with a single wrist movement, redistributing weight across finger pads). This requires an "enhanced sense of process, an active anticipatory aural intention, running ahead as if in a continuous search for continuation while simultaneously holding both what has just sounded and what is sounding now" ("the factor of binding and sustaining the image" (*Malinkovskaya, 2005, p. 287*)). The difficulty lies in the dialectical unity of a musical phrase that begins with a prolonged sustained sound and yet unfolds in unbroken musical thought.

The piece demands a certain level of performance proficiency and technical preparation: flexible, free, elastic hands combined with firm, controlled tension. Improvisatory performance intonation is characterised by an acute sense of processual immediacy, intense emotional communication, and a heightened orientation towards the listener's perception, both momentary and holistic ("the phenomenon of mutual intonational attention and understanding" between performer and listener) (*Malinkovskaya, 2005, p. 288*).

The performance analysis of Edvard Grieg's piece *"Butterfly"* takes place through a "live" dialogue between the teacher and the student, accompanied by a pedagogical performance demonstration of hand movements and gestures.

During independent classroom work, it is recommended that students master the following exercises from the interactive digital programme *Soft Way to Mozart* by E. V. Khainer:

1. *"Butterfly"*—a miniature piece performed (a) on one; (b) on four "note-sounds" (a term proposed by the scholar, researcher and music pedagogue E. V. Khainer (Nikolaeva), used within the framework of her philosophical-aesthetic views, theory and methodology of teaching musical literacy at the International Academy *Soft Way to Mozart*);
2. *"Eye Etudes"*—a set of exercises designed for the assimilation and refinement of students' knowledge of musical notation (a system of tasks aimed at reinforcing the perception and recognition of graphic note-sound symbols, and at coordinating visual, auditory, spatio-temporal, sensory and motor skills). The etudes consist of a series of exercises using "note-sounds" placed on the staff lines and in the spaces between them;
3. Pieces from various albums of the *Gentle Piano* module of the *Soft Way to Mozart* programme.

Control Stage of the Pedagogical Experiment

Monitoring of results and final diagnostics were carried out through the modelling of training sessions during teaching practice and through the students' concert performances.

The results of the final diagnostics indicate that in the experimental group (EG) there was a 100% quality rate of learning: 80% of the EG students achieved an advanced level of developed independence, and 20% demonstrated a minimally acceptable level of this quality. The quality of learning in the control group (CG) amounted to 60%: only 40% of the students reached an advanced level of developed independence, 20% showed a minimally acceptable level, while 40% exhibited an insufficient level of this quality. The qualitative indicators in the EG increased fivefold, whereas the results in the CG changed only slightly (a growth of 1.5 times).

Thus, the pedagogical conditions for fostering independence in music-pedagogical education have been identified, and an algorithm for cultivating students' independence in the process of musical-instrumental training at a pedagogical university has been developed and substantiated. Diagnostic tools (criteria, indicators, levels) and diagnostic materials (questions, tasks) for assessing the development of independence among students in the context of musical-instrumental training at a pedagogical university have been established. The pedagogical experiment confirmed the validity and pedagogical relevance of the developed algorithm for fostering independence in music-pedagogical education.

Discussion

"To educate one's pupil to become a good musician and thereby prepare them for independent practical work is the essential task, the ultimate goal pursued by every teacher." (*Kremenstein, 2009, p. 7*) This is difficult to dispute. Yet, in practice, one often observes a lack of independence, and consequently a lack of readiness among teachers to address the diverse challenges of music and music-pedagogical education.

A central issue in music-pedagogical education in today's digital era concerns how to foster and nurture the personality of the teaching musician: what paths and methods are required to develop artistic-creative (intonational) thinking, and thus the capacity for empathy, cooperation, and co-creativity within music-pedagogical activity? The teacher directly influences the potential nature of humanity's future. Consequently, the issue of preparing pedagogical personnel—particularly music teachers capable of creative, unconventional thinking and of technologically structuring the educational and instructional process of musical-instrumental training—remains critically acute. Such teachers must be able to teach in the fullest and noblest sense of the term.

The preparedness of music teachers for independent professional activity upon graduation from a higher education institution constitutes a significant criterion of their professional competence. Numerous researchers emphasise that the maturity of professional thinking, and thus the beginnings of pedagogical mastery, are directly connected with fostering learners' independence, the formation of abilities to identify the essence of a problem and to understand ways of resolving it. This includes selecting the most efficient and appropriate working methods, setting objectively attainable goals, and planning the musical-educational and instructional process, as well as the course and content of lessons.

Instrumental-performance activity, as an integral component of a musician-teacher's professional mastery, is of equal significance to other forms of musical creativity. Its importance lies in the fact that instrumental melody is, at its core, modelled on human speech. It is therefore essential to learn to perceive and feel the artistic-semantic expressiveness of instrumental discourse. The richness of instrumental melos corresponds to, and overlaps with, the diversity of verbal communicative speech. To think today means to comprehend and follow the unfolding of musical thought. This effectively disciplines and organises cognition in time and space, fostering an understanding of sensorimotor and proprioceptive sensations.

The prospect of further research lies in the synthesis—through integration and convergence—of cognitive knowledge and practical experience from various disciplinary scientific domains, aimed at developing a technological model for fostering independence among students in the process of musical-instrumental training within a pedagogical university.

Conclusion

The aim of the study—namely, the development and substantiation of an algorithm for fostering learners' independence within the process of musical-instrumental training at a pedagogical university—has been achieved.

The following objectives have been accomplished:

1. The works of prominent pedagogues-practitioners and specialists in the psychology of musical activity have been analysed in the context of examining the problem of fostering independence in music-pedagogical education. A set of specialised piano-performance

skills directly involved in fostering independence among students in the context of musical-instrumental training at a pedagogical university has been identified, and the areas of training for future musician-teachers associated with developing learners' independence have been delineated. It has been demonstrated that independence constitutes an essential professionally significant quality of a future music educator and a determining factor in their professional success;

2. An algorithm for fostering learners' independence under the conditions of musical-instrumental training at a pedagogical university has been developed, substantiated, and tested. The following sequence of operational steps in the process of fostering students' independence under these conditions has been identified:
   (a) artistic-pedagogical analysis of musical works
   (b) critical analysis of the technology of artistic piano intoning in the context of ideas from biomechanics and the physiology of activity, as well as the principles of the theory of piano intoning;
   (c) improvement of music-reading skills through the *Soft Way to Mozart* programme while working with the modules *Gentle Piano* and *Note Alphabet*;
3. A pedagogical experiment conducted to test the proposed algorithm for fostering independence within the musical-instrumental training of students at a pedagogical university confirmed the validity and soundness of the author's theoretical propositions and methodological considerations. It has been proven that fostering independence is a necessary factor in stimulating the artistic and creative thinking of future musician-teachers.

Future research should focus on identifying correlations between the issues addressed in this study and the ideas and principles underlying the theory of fostering a culture of artistic instrumental performance intoning at different stages of musical and music-pedagogical education, both from a diachronic perspective and in terms of the synchronic coherence of parts and whole within the context of continuity of traditions and the heritage of the national performance-pedagogical school.

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Conflict of Interest

The author declares that there is no conflict of interest.

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Maxim V. Bakhtin [a][8]

Metaphysical Principles of Causality and Normativity in Historical Cognition [7]

Abstract:
This study is timely in the context of the contemporary reassessment of the foundations of scientific rationality, the crisis of classical determinism, and the necessity of accounting for normative structures in historical cognition. Amidst methodological pluralism and increasingly complex conceptions of freedom of human action, the analysis of the metaphysical principles of causality and normativity acquires particular significance. An awareness of the multidimensionality of human activity demands the integration of causal and value-based foundations in the explanation of historical processes. The novelty of this study lies in proposing an integrative approach that unites causal and normative structures as two fundamental metaphysical principles of historical cognition. The study explores the contemporary interpretation of freedom as a creative act that disrupts the causal chain, and it demonstrates the methodological irreducibility of normativity to causality. The subject of the study is the correlation between the metaphysical principles of causality and normativity within the structure of historical cognition. The object of the study is human action as an element simultaneously incorporated into both the causal and normative orders. The study aims to identify the roles of causality and normativity in the formation of historical explanation models and in the philosophical understanding of free will. The methodological basis of the study includes analysis, synthesis, historical-genetic and comparative methods, as well as phenomenological, hermeneutical, and dialectical approaches, which allow for a comprehensive understanding of the evolution of the categories of causality and normativity. The application of metaphysical analysis and conceptual reconstruction ensured the identification of a link between changes in scientific rationality and the transformation of historical models of thinking. The study traces the evolution of causality and normativity: from primitive normative syncretism and ancient conceptions of fate to the classical scientific model built on the continuity of causal connections, and its subsequent critical reassessment in the 20th century. It is shown that historical cognition is impossible without considering normative structures, which define the subject's motivation and responsibility, and that contemporary philosophy is turning towards an integrative model that combines explanation and interpretation. The main challenges addressed by the study are related to the limitations of universal deterministic explanations and the difficulty of formalising normative structures. An additional problem is the gap between natural-scientific and humanistic models of rationality. The study confirms that causality and normativity prove to be complementary principles essential for the complete reconstruction of the historical process, which opens up prospects for the further development of an integrative philosophy of history.

Keywords: causality, normativity, free will, necessity, objective universal laws.

Introduction

The problem of the metaphysical foundations of human freedom and the principles that determine the structure of historical cognition remains one of the central concerns in contemporary philosophy. In the context of escalating methodological pluralism and the crisis of classical rationality, the question of how an individual understands their choice, motivation, and responsibility acquires particular urgency. Contemporary science no longer relies on the notion of a single, universal type of rationality characteristic of the Enlightenment era; instead,

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an increasingly pronounced divergence between various forms of world comprehension is evident.

Historical cognition finds itself at the epicentre of this methodological shift, as it simultaneously operates with causal structures and with normative systems regulating human behaviour. As the critique of deterministic models deepens, it becomes obvious that the absolute continuity of cause-and-effect relations, which forms the core of the classical scientific worldview, is no longer capable of explaining the complexity of human agency. In the humanities, attention is intensified towards the role of free choice, cultural attitudes, value systems, and "metaparadigmatic" decisions that shape the horizons of historical experience. Following this, a need arises to reconceptualise the relationship between causality and normativity as two fundamentally distinct, yet inextricably linked, modes of world explanation.

Contemporary study emphasises that the metaphysical foundations of historical cognition cannot be reduced to a single model of world order; rather, they necessitate taking into account the multi-layered nature of reality, where objective necessity coexists with human freedom. In transitional societies undergoing transformations of value systems and structures of historical memory, this problem becomes especially significant, as the selection of a "metaparadigmatic framework" determines the very possibility of interpreting the past and shapes the normative guidelines for the future.

The novelty of the study lies in the attempt at a comprehensive analysis of the metaphysical principles of causality and normativity as two equally valid foundations of historical knowledge, influencing the understanding of free will. In contrast to traditional approaches, where causality is considered a universal explanatory instrument, this work is based on the idea of the heterogeneity of the world order and the impossibility of reducing the normative dimension to the causal.

The study proposes a non-classical interpretation of freedom as a creative act that disrupts the continuity of the cause-and-effect sequence and initiates a new metaphysical and historical context. A significant contribution is the thesis that normative structures are not derived from the natural order, but are formed as a result of the collective choice of a specific model of life, which renders them historically changeable and culturally conditioned.

The novelty also consists in the comparison of classical scientific rationality with contemporary forms of thought, which admit discontinuity, heterogeneity, and the multiplicity of the grounds of existence. Such a comparison allows for a critical reappraisal of the status of causality in historical cognition and identifies new possibilities for the investigation of free will as a metaphysical category.

The subject of the study is the metaphysical foundations of causality and normativity as structures that shape the modes of interpreting human actions and historical processes. The analysis includes their philosophical evolution, mutual transformation, and influence on the methods of historical cognition. Particular attention is paid to how these principles determine different types of rationality and explanatory models.

The object of the study is human action as a phenomenon simultaneously included in the cause-and-effect world order and subordinate to normative structures that determine freedom of choice and responsibility. More broadly, the object is historical cognition, within which causal explanations and the normative grounds of human activity interact.

The study aims to identify the role of the metaphysical principles of causality and normativity in shaping models of historical cognition and in the comprehension of free will.

Based on this purpose, the following objectives are addressed in the work:

- analyse the content of the metaphysical principles of causality and normativity and their historical evolution from ancient conceptions to classical and post-classical science;
- investigate the differences between the causal and normative orders as foundations of human agency and world structure;
- identify the ways in which causality and normativity interact within the structure of historical cognition and in the understanding of human freedom;
- consider the mechanisms of forming normative structures as a result of free choice and their impact on historical interpretation;
- establish the limitations of deterministic models and demonstrate the significance of normative acts of creativity and responsibility in the humanistic perspective.

Methods

The investigation into the metaphysical principles of causality and normativity within historical cognition necessitates the application of a complex set of general scientific and specialised philosophical methods. This approach ensures the systemic integrity, depth, and critical reflection of the results obtained. Given that this problematic addresses the fundamental underpinnings of human freedom, the structure of the world order, and the evolution of rationality, the research methodology must account for both the historical dynamics of the formation of key categories and the specifics of their function in diverse cultural and historical contexts.

The work is fundamentally based on the sequential analysis and synthesis of conceptual material. Analysis enables the breakdown of the central categories—causality, normativity, freedom, rationality—into their structural components and reveals their internal relationships. It is employed in examining the distinctions between the givenness (*данность*) and the task/potentiality (*заданность*) of human existence, in interpreting the concepts of "necessity", "motivation", and "responsibility", and in investigating the content of the causal and normative models of the world presented in the article's text.

Synthesis, conversely, ensures the assembly of these elements into a unified theoretical construct. This construct reflects the logic of transition from the normative arrangement of the primeval world to the classical scientific interconnectedness of causes and effects, and subsequently, to contemporary non-classical forms of thought which admit discontinuity and a multiplicity of grounds.

The inductive approach is applied in the analysis of a broad range of historico-philosophical material: from archaic notions of "guilt and retribution" to the Stoic doctrine of fate, the Cartesian concept of the law of nature, and Newtonian universalism. It is used to identify the general regularities in the formation of worldviews that link human beings with the orderliness of the world. Deduction allows for the formulation of conclusions regarding the nature of classical rationality, its aspiration for the continuity and closure of causal chains, and the logical impossibility within it of an act of freedom emerging as a "gap" between causes. Deductive generalisations are then tested against concrete examples provided in the article's text, including

the comparison of the normative order of antiquity with the causal order of Early Modern science.

The historico-genetic method serves as the foundation for reconstructing the evolution of conceptions of causality and normativity. It enables us to trace how the initial identification of guilt and cause (*aitia*) in ancient thought was gradually transformed into a strictly scientific understanding of causality, where norms are no longer viewed as an expression of the will of gods or higher powers. It helps to explain why the classical scientific worldview progressively displaced the normative type of worldview, and was subsequently subjected to criticism itself in the 20th century, a process which is revealed in detail in the text under study.

The comparative method is employed for juxtaposing various models of world explanation: the normative, based on retribution and responsibility; the causal, founded on the continuity of cause-and-effect relations; the classical scientific, striving for universal determinism; and the non-classical, admitting ruptures and external influences. The method allows for the identification of the profound differences between these types of rationality and demonstrates that their mutual irreducibility is key to understanding the nature of historical cognition.

The structural-functional approach provides for the analysis of causality and normativity as grounds that fulfil different functions in the formation of the world order. Causality is examined as a mechanism for explaining the sequence of events, while normativity is seen as a structure that sets rules, values, and the boundaries of human activity. This method aids in understanding why an origin connected with an act of free choice is possible within the normative order, whereas such an origin is absent in the causal order. On this basis, it is demonstrated that historical cognition cannot be reduced to a single explanatory model.

The phenomenological method is applied to analyse the human experience connected with the perception of "givenness"—objective circumstances determined by the past—and "task/potentiality"—ideals, norms, and goals directed towards the future. This approach allows for the identification of the structure of human motivation, as shown in the text under study, and for understanding how the individual experiences the rupture between natural necessity and normative requirements. Phenomenological analysis reveals that the act of freedom arises at the point where a person acts not as a consequence of a causal series, but as the origin of a new chain of events.

The hermeneutical method is used for the interpretation of the philosophical concepts unified in the research. It allows for the uncovering of semantic shifts undergone by the notions of law, cause, punishment, fate, norm, and necessity across different epochs. Hermeneutics also helps to reveal the hidden assumptions underlying classical science and to explain why contemporary philosophy rejects the idea of universal determinism.

The dialectical method is essential for analysing the contradictions between causality and normativity. It demonstrates that these forms of world order exist in a state of tense unity and that the development of rationality occurs through their mutually conditioned transformations. Dialectical logic explains the historical dynamics of transitions—from the normative order of antiquity to the causal order of science and further to non-classical rationality, which permits ruptures and creative acts.

The method of conceptual reconstruction is employed to restore the substantive structure of the classical scientific worldview. It allows for the identification of its metaphysical

foundations: the conception of a continuous causal chain, of the reversibility of time in the logical sense, and of the independence of natural laws from human will. This method is also applied to the analysis of the contemporary critique of determinism described in the text under study.

The metaphysical method occupies a central position, as the research concerns the ontological grounds of freedom and order. It enables questions to be posed about the nature of being, the structure of law, and the relationship between necessity and freedom. The application of metaphysical analysis explains why causality precludes a creative act, while normativity makes it possible, and also reveals the consequences of these distinctions for historical cognition.

Philosophical critique and deconstruction of classical rationality are used to identify the limitations of the determinist model of the world. Critical analysis shows that universal causality fails to account for the normative structures through which the human being actualises freedom and responsibility. Deconstruction enables the uncovering of the hidden metaphysical presuppositions of classical science and explains why they came to be perceived as self-evident.

Finally, the method of idealisation and thought experiment is applied to the analysis of models of world order, such as the normative cosmos, the classical deterministic universe, and the non-classical world of ruptures and creative acts. Thought experiments help to demonstrate the consequences of absolute determinism—the disappearance of freedom, historicity, and responsibility—and why the normative perspective proves necessary for understanding human activity.

The application of the aforementioned methods has made it possible to:

1) reveal the historical dynamics of the formation of conceptions of causality and normativity;
2) demonstrate their metaphysical irreducibility to one another;
3) uncover the internal logic of worldview transformations from archaic consciousness to the non-classical rationality of the 20th century;
4) explain how freedom manifests as an act that ruptures the causal chain and establishes a normative order;
5) substantiate the impossibility of reducing the normative dimension to natural scientific laws;
6) emphasise the significance of metaparadigmatic decisions and creative choice as the foundation of historical cognition.

Literature Review

The problem of the metaphysical foundations of causality and normativity, as well as their role within the structure of historical knowledge, has been shaped in scholarship over several centuries, which makes the analysis of existing literature a fundamentally important stage of the research. Among domestic studies, one of the key sources is the work of Balakhonsky (*1997*), which examines in detail the epistemological and methodological foundations of explaining history and demonstrates the dependence of historico-philosophical concepts on shifts within rationality. Also significant is Bakhtin's work (*2011*), which analyses models of history from a socio-anthropological perspective, with particular attention to the relationships between cultural attitudes, forms of worldview and historical reflection. Bransky (*2006*) likewise emphasises the question of the meaning of history and stresses that historical understanding is inevitably

connected with the interpretation of purposiveness and the normative structures of human activity.

Among philosophers of science, Bachelard (*1986*) made a substantial contribution to the development of the topic of the correlation between causality and normativity. In his works he demonstrated the limitations of classical forms of determinism and the necessity of revising reductionist scientific models. Another important field of inquiry is the sociology of knowledge, where the notion of the social construction of reality takes centre stage, as presented in the fundamental study by Berger and Luckmann. The authors show that social institutions and norms define the frameworks within which the world is interpreted and constitute the necessary precondition for understanding human action (*Berger & Luckmann, 2009*). This position supports the idea that normative structures cannot be reduced to a natural-scientific causal order.

The historical roots of philosophical notions of causality and normativity can be found in the works of ancient thinkers. *Fragments of Early Greek Philosophy* (*1989*) make it possible to trace the formation of the first cosmological models of order and the interrelation between divine ordinance, moral norms and natural processes. Of particular value is the collection by Diogenes Laertius (*1979*), which records the views of ancient schools for whom causality and fate often coincided within a unified conception of world order. These texts allow the reconstruction of the early normative-causal syncretism characteristic of ancient thought.

A fundamental influence on the formation of classical conceptions of causality was exerted by the works of Leibniz (*1984*), in which the idea of the continuity of world order and the strict correlation between cause and effect was elaborated. Later this line was radicalised in the scientific works of the Early Modern period, where the mathematization of nature reached a high degree of formalisation. A key testament to this process is the monumental *Principia Mathematica* by Whitehead and Russell (*1910*), which became a symbol of faith in the universality of the logico-mathematical apparatus. Also illustrative in this context is the analysis by M. Kline (*1984*), who in the twentieth century revealed the crisis of mathematical certainty and demonstrated the limitations of rationalist models of scientific cognition.

A critical reassessment of classical determinism is most vividly presented in the works of I. Prigozhin (*1989*), which highlight the impossibility of reducing complex systems to linear causal models. Prigogine emphasised the need to acknowledge the openness of the future and the role of probabilistic processes in nature. This position became an important premise for non-classical concepts of rationality and underscores the limitations of classical metaphysical determinism.

The shift away from rigid determinism toward more flexible conceptions was significantly influenced by research in analytic philosophy. One of the key sources is Anscombe's work (*1971*), where causality is analysed as a concept that cannot be reduced to mechanical determinism but is instead determined by the contextual structures of human practice. D. Lewis (*1973*), in turn, developed a counterfactual model of causality, emphasising its modal nature and dependence on possible worlds. These works substantially expanded the understanding of causality beyond the classical linear model.

A major contribution to rethinking the relationship between necessity and freedom was made by Hannah Arendt. In her seminal study *The Human Condition*, she investigates the

categories of action, freedom and responsibility, understood as events that break causal continuity and introduce a new beginning into history (*Arendt, 1958*). This approach is particularly important for the analysis of the metaphysics of normativity, where freedom is seen as an act of creative establishment of order.

The question of the structure of cognition and the role of the subject in the interpretation of being occupies a central place in Martin Heidegger's philosophy. In *Being and Time* he demonstrates that human existence is always already immersed in meaningful structures that determine the horizons of understanding, and that the analysis of being is impossible without considering existential freedom (*Heidegger, 1962*). At the opposite pole lies the classical epistemology of I. Kant (*1998*), in which causality is viewed as an a priori category of the understanding, and normativity as the practical law of freedom. These works provide the theoretical framework necessary for comprehending the dual nature of causality and normativity.

An important body of literature is associated with the philosophy of science. C. Hempel (*1965*) proposed a model of scientific explanation based on deductive-nomological structures, which became one of the most influential formalisations of causality in the twentieth century. In contrast, K. Popper (*1959*) criticised determinism and introduced the principle of falsifiability as a tool of scientific rationality that admits the openness of the future and the creativity of scientific thought. M. Bunge (*1959*) developed a pragmatic-scientific approach to causality, stressing its operational nature and connection with empirical investigation. The works of R. Bhaskar (*2008*) within the framework of critical realism proposed a stratified understanding of reality, in which causality operates on different ontological levels and cannot be reduced to linear mechanisms.

The philosophical-humanitarian trajectory is represented by the works of Ch. Taylor (*1985*), who showed that the understanding of human action is impossible without taking into account normative structures, values and cultural meanings that constitute the space of freedom. In *The Archaeology of Knowledge*, M. Foucault (*1972*) reveals the idea of epistemological ruptures and the historical conditions of forming discourses, demonstrating that normativity is not only a moral but also an epistemic category. His analysis makes it possible to view causality and normativity as elements of distinct discursive regimes.

Thus, the literature on the topic forms a multilayered field that includes ancient philosophy, classical metaphysics, Early Modern philosophy, phenomenology, analytic philosophy, critical realism, the sociology of knowledge and contemporary studies of rationality. All these traditions demonstrate that causality and normativity possess a complex historical dynamic and diverse ontological statuses. The classical tradition sought to universalise causal order, whereas contemporary research emphasises the necessity of recognising the multiplicity of types of rationality, the cultural conditionedness of norms and the creative character of freedom. The literature review shows that the problem of the relationship between causality and normativity requires interdisciplinary analysis that takes into account both historical forms of thought and modern philosophical conceptions, which determines the relevance of further research.

Results

One of the most pressing issues for any transitional society is the theoretical understanding of the freedom of the human will and its metaphysical foundations. In this regard, the metaphysical principles of causality and normativity emerge as the fundamental bases for the organisation of our representations of the world and its cognition. From the mid-20th century onwards, as the historical and socio-cultural conditioning of the rationalist ideals of classical philosophy becomes increasingly evident (*Bachelard, 1986*), the initial intuition of some universal, single and unique rationality loses its former clarity and becomes ever more blurred and indeterminate. At the very least, it becomes clear that not only theoretical knowledge but also human practical behaviour, unmediated by any theory, can be rational.

The rationality of actions presupposes, at the very least, that they are motivated. Motivation, in turn, is conditioned, on the one hand, by givenness—the factual state of affairs, the objective circumstances in which a person finds themself—and, on the other, by "setness", that is, by their understanding and interpretation of these circumstances. Depending on the meaning ascribed to them, human behaviour in one and the same situation may be markedly different—indeed, even diametrically opposed. Givenness is determined by the past: all circumstances are conditioned by events that have already taken place and which, in their totality, have led to the present state. "Setness" is not directly present in the present. It is, rather, an impulse, an orientation towards the realisation of a certain imperative that is offered to the person, or posited by themself, as an ideal or a norm. Thus, the present in which a person finds themself constitutes a rupture between givenness (the past) and setness (the projection of the future). It is within this rupture that real human life unfolds, as a person, through their reflections and actions, continually reconnects the thread of their own being.

Setness, like givenness, is something external to the individual; therefore, the striving towards it may be interpreted as an ever-renewed attempt to transcend the boundaries of givenness, as a striving towards transcendence. Science is one of the forms in which this striving is realised, insofar as it represents a way of transcending setness through the formulation of laws of nature and methodological principles of thought. However, science is not the only form in which such striving is embodied. I. Prigozhin, e.g., writes that "Europeans live at the intersection of at least two different systems of values: on the one hand, scientific rationality, and on the other, the rationality of collective behaviour." (*Prigozhin, 1989*) Yet rationality, whatever form it takes, is always grounded in a conscious conviction or instinctive belief in the existence, in the world, of a certain definite and stable order. The very presence of such a conviction (or belief) serves as the deepest foundation for affirming ontological determinations of being, whilst the concrete content of these determinations largely depends on the content of the fundamental convictions or beliefs characteristic of a particular historical epoch. How and from what do such convictions and beliefs arise? How do they influence the content of our ontological representations? How do they change, and what happens as a result of these changes?

In prehistoric thought there may have been nothing at all—and, in all likelihood, indeed there was nothing—resembling contemporary scientific conceptions of nature as an ordered sequence of phenomena linked by causal relations. Yet this can scarcely be taken to mean that prehistoric thought was altogether devoid of the idea of the world's orderedness. Rather, one may speak not of the absence but of the different character of this order. That which appears

to contemporary scientific consciousness as nature external—and even opposed—to the human being, appeared to the ancient human as the immediate continuation of their life-world, which was tightly bound by a system of moral or legal norms. The social order regulating human behaviour was extended to the entire world, an understanding of which was constructed not on causal (cause–effect) but on normative (guilt–retribution) relations.

Ethnographic research indicates that the notion that the human being is responsible for everything that happens in the world belongs among the most archaic stereotypes of thought (*Fragments…, 1989*). Many ethnographers note that the prehistoric human interpreted what we call natural phenomena not as spontaneous events indifferent to their fate, but strictly in accordance with the principle of retribution, regarding favourable events as reward and unfavourable ones as punishment. The dualism between nature as a causal order and society as a normative order was wholly alien to prehistoric consciousness, just as it is (albeit with the opposite sign) to the scientistic consciousness of the contemporary human.

Potentially, a worldview grounded in normative relations differs substantially from a causal one, although mytho-religious consciousness may, for a long time, remain entirely insensitive to this difference. For such consciousness, the connection between natural phenomena, just as between social phenomena, is the result of divine ordinance, and the laws of nature—like social laws—are nothing other than the expression of the will of the creator: norms prescribing to natural objects certain rules of behaviour, the violation of which entails inevitable punishment. It is noteworthy that in ancient Greece both cause and guilt were designated by the same word—*atria* (*Diogenes Laërtius, 1979*). Apparently, the conception of the law of causal relations arises through a re-interpretation of the concept of law-as-norm, which binds guilt and retribution. The transition from normative order to causal order consists in the human being's realisation that relations between things, unlike relations between people, are independent of both human and supra-human will, or, which amounts to the same thing, are not determined by norms. However, this transition was neither simple nor instantaneous.

The history of the formation of the conviction that there exists a completely impersonal natural order—a conviction that constitutes the ontological core of classical rationality—stretches from the first natural philosophers of ancient Greece to the meta-scientific investigations of Galileo, Descartes and Newton. Already in Plato's philosophy, the conception of the Cosmos as a hierarchically organised system is formed, in which the ideal world is separated from, and opposed to, the world of objects. This higher world of pure essences is interpreted as the eternal and immutable prototype (the ideal plan) according to which the order of things and phenomena that constitute the human being's immediate environment arises and exists. The order of the phenomenal world is given to us as a reflection of that order which exists in the ideal world, yet as a reflection that is crude, inexact and approximate. True being is not given to us in our immediate experience. Therefore, the comprehension of universal laws and the true meaning of being is attainable exclusively by means of pure intellectual contemplation. Empirical cognition does not even deserve to be called knowledge; it is designated by the special term "opinion". Genuine knowledge is the result of intellectual vision that discloses the pre-given order and meaning of the being of the world and, therefore, the genuine vocation of the human being (*Hempel, 1965*; *Popper, 1959*).

Nevertheless, a complete separation of causality from normativity does not occur even in ancient philosophy. A significant number of ancient authors continue to interpret the law of nature precisely as an established order, and the notion of cause is scarcely distinguished from that of fate: "Everything happens by the decree of fate, as Chrysippus… Posidonius, Zeno, as well as Boethus, say <…> Fate is the continuous [chain] of causes of what exists, or the reason according to which the universe is governed." (*Diogenes Laërtius, 1979*) Even by the seventeenth century this separation can still not be regarded as fully accomplished. Thus, in his Discourse on the Method Descartes speaks of laws 'established by God in nature', and in a letter to Mersenne he asserts that "God has established these laws… just as a sovereign establishes laws in his kingdom." (*Kline, 1984*) The decisive step towards a complete separation of causal order from normative order is taken by Newton when he endows the law of nature with a universal and all-encompassing character.

In affirming the unity of the laws of celestial and terrestrial mechanics, Newton proceeds from a firm conviction in the existence of a single, unique world order embracing all phenomena of both the supra-lunar and the sub-lunar worlds. The ancient conception of the Cosmos as a hierarchically ordered system is replaced by the foundational modern scientific idea of the Universe, whose order and laws apply equally to the motion of the heavenly bodies and to the displacement of terrestrial objects, all describable by one and the same set of mathematical formulae. And although in Newton's own fundamental convictions we still find reminiscences of the ancient normative order, from his theism it is but "a step" not only to Leibnizian deism, but also to Laplace's radical determinism, which definitively expels the idea of sovereign will (as the basis of normativity) beyond the bounds of science (and rationality in general).

From this new perspective a strange and previously unknown world opens up before the human being—a world governed by a single universal set of causal laws that admit of precise mathematical expression. Yet a law is perceived by us as a truth, excluding the possibility of any contrary propositions, only when it is sanctioned by a supreme authority. In this "new world" such an authority is assumed by science, which claims both supreme knowledge and supreme power.

Science's claim to the role of supreme authority rests on the fundamental conviction that the causal order prevailing in the world makes it possible (provided certain logical and methodological procedures are observed) to correlate each phenomenon precisely and unambiguously with all that precedes and all that follows it.

The unpredictability of particular events is viewed, from a causal standpoint, as a purely epistemological phenomenon lacking any ontological presuppositions. Nothing that occurs comes into being without an appropriate cause. Surprises exist only for us, and only insofar as we have not yet discovered all these causes. We hope to use the causal connections already known and comprehended by us as means for achieving our own ends, but the constant intervention in our activity of innumerable regularities as yet unknown to us leads to a situation in which, contrary to our will, we ourselves become one of the means for the manifestation of some global necessity.

The principle of causality, regarded as a fundamental ontological characteristic of being, implies that a person can realise their striving for freedom only by subjecting their life to a universal objective law. To dispose freely of their future, an individual thinking in categories of

causality must exclude from consciousness everything contingent, retaining therein only what is necessary. In other words, in order to be free, a person must become necessary not only in their means, but above all in their motives and ends: they must not desire anything that is not "provided for" by objective necessity. Strict adherence to the causal principle does not allow us to regard our own activity as fully autonomous. For if each of our actions is the "resultant" of a multitude of objective factors, many of which we do not even recognise, then our behaviour is determined by something other than our will. "Science", writes F. M. Dostoevsky in *Notes from Underground*, "will teach man that… everything he does is done not at all according to his desire, but of itself, according to the laws of nature. Consequently, once these laws are discovered, man will no longer be responsible for his actions."

Causal thinking is formed as the result of a sufficiently long process of radical transformation in conceptions of how the world is ordered. The world of traditional society is a world governed by normative (social) order, which is also extended to the whole surrounding reality. The modern European world is a world of causal (natural) order, to which there is now an attempt to subordinate both society and the individual. This world is literally created in the process of the formation of European science and appears to us as the result of a change in the most fundamental ontological representations of the order that governs the world.

Leibniz, one of the most authoritative creators of the new science, holds that the order prevailing in the world is such that "every complete action represents [its] complete cause", and therefore "from knowledge of this action I can always arrive at knowledge of its cause." (*Leibniz, 1984*). If the cause is 'fully represented' in the effect, this means that the logic of our cognition must be just as sequential and uninterrupted as the chain of causal connections in nature itself. Strictly speaking, however, what is at stake here is less an epistemological than an ontological principle. Leibniz's conviction of the causal nature of the fundamental world order presupposes that all events form a continuous series, in which causes and effects are absolutely contiguous, with no "gaps" between them. The world is revealed to us as a certain perfect unity, as an integral, nowhere ruptured succession of phenomena connected with one another by relations of necessity. Yet this thesis is nothing other than a particular ontological principle, tacitly present at the foundation of classical science. According to this principle, the whole of nature is unconditionally subject to mathematically formulated laws, whose operation is manifested in the inexorability of causal relations. Within such a framework, there is simply nowhere for the human being to "insert" their free will, the manifestation of which is always associated with the emergence of a "gap", a break in continuity.

As a result, an attitude becomes established and widely diffused in which nature is conceived as a kind of a-historical entity. For if the complete cause of any phenomenon is contained within it as its complete effect, this means that they are equivalent. But the equivalence of cause and effect, in turn, implies nothing other than the reversibility of time (at least in a logical sense). And if physically we are incapable of turning the world process backwards, then to enact such retrograde movement logically is not only possible, but constitutes the direct duty of the person of science. The notion of the a-historical character of scientific laws, relating first and foremost to the sphere of natural processes, gradually spreads into the sphere of human existence.

Over the past three hundred years this Leibnizian "formula" of the fundamental world order has become dominant not only among scholars and philosophers; even in everyday consciousness there has taken shape a stable conviction in the inviolability of causal laws, which organise everything that happens in the world into uninterrupted chains of cause and effect stretching from an infinite past into an infinite future (*Leibniz, 1984*). However, by the mid-twentieth century, among professionals—philosophers, scientists and methodologists of science—confidence in the all-embracing character of the causal world order loses its former firmness. Disillusionment with the ideals of universal determinism grows. As a result, the fundamental premises of classical modern rationality—the ontological principle of the continuity of causal relations and the epistemological principle of the unity of the system of rational knowledge organically bound up with it—are called into question. The break with tradition is experienced so acutely that Gaston Bachelard (*1986*) characterises the very idea of universal determinism of the Leibnizian type as an incredible, monstrous idea.

Here, as in the case of forming the classical ideal, the change in epistemological perspective and the revision of ontological foundations are inseparably linked with a change in conceptions of the prevailing world order. It is precisely on the basis of such conceptions that our preliminary assumptions are formed concerning what is truly significant and meaningful in this world (*Bhaskar, 2008*). The most fundamental ontological presupposition of classical science—the being of nature as the ultimate givenness existing "in itself", independently of our human existence—becomes unacceptable under new conditions. Yet together with the differentiation of natural and human being, the conception of the world as some absolute, indivisible unity, subject in all its spheres and manifestations to one and the same universal causal laws, also becomes unacceptable. If, from the standpoint of the classical ideal, all relations, both in the sphere of nature and in the sphere of the human life-world, were regarded as internal relations between elements of a single, unique system, there now arises the possibility of taking into account external influences whose operation disrupts the rigid linearity of classical determinism.

The "image of the world" changes not only through the natural causal processes unfolding within it. A transformation in the conceptual organisation of thought may provide us with a wholly different structure for the articulation of being, opening up a new perspective in which not only the meaning and significance of familiar things change, but we in effect find ourselves in a new world, with different objects and different facts. The very principles of the structuring of being are now considered not as something originally inscribed into the nature of the world, but as the result of the adoption of particular meta-paradigmatic stances. The choice in favour of a given conception of world order is a creative act that rests not so much on discursive reflection as on a volitional decision, which constitutes a rupture in the chain of causal (and logical) relations. Such a choice can neither be reduced to any formalised algorithm nor derived from preceding history as an effect from its cause. From the standpoint of classical rationality, this is an irrational act. In reality, however, what is at issue here is not so much irrationality as a different, non-classical type of rationality—the rationality of "collective behaviour". In any case, we are dealing here with the choice of a particular model of communal life.

However, unlike the causal order of classical rationality, normative world order is no longer regarded either as an absolute, eternal characteristic of being and thought as such, or as the result of the operation of some powerful transcendental sovereign will. This order is understood

as one established or recognised by human beings, rather than by a supra-human power, and therefore as having normative force only within the confines of a given cultural community or historical epoch.

The internal difference between causality and normativity as principles of the organisation of world order consists above all in the following. From a causal perspective, any phenomenon is viewed as the effect of some cause and at the same time as the cause of some other effect; therefore, the causal chain appears as a continuous, nowhere broken line that issues from infinity and recedes into infinity (*Heidegger, 1962*). The normative perspective, in contrast to the causal, presupposes a quite definite beginning—that very creative act of the free choice of a meta-paradigmatic stance through which the boundary conditions are set for the functioning not only of a particular type of thinking but of the life of the social organism as a whole. It is precisely in this fundamental difference between causality and normativity that the opposition between the necessity that prevails in nature and human freedom is rooted. That the human being is free means precisely that, in affirming particular norms, they can act as the initial (first) link in a certain causal series. In taking such a decision, they act as the cause of effects, and not as the effect of a cause. This understanding of freedom differs radically from the "recognised necessity" of the causal tradition.

The unfolding of a causal sequence takes place as a smooth transition from one possible world to another. An act of freedom is a break in continuity that irreversibly carries us into another world, which is at once created by this very act. Here we are no longer speaking of a cause but, rather, of guilt. We are guilty of this transition; we have created this world, and we are responsible for the fact that it now exists. Guilt here is understood not in a moral-evaluative, but in an ambivalent (metaphysical) sense, for the emergence of either good or evil from our action is equally probable (*Berger & Luckmann, 2009*). Responsibility therefore signifies not punishment, but the awareness of one's active participation in life, one's belonging to being.

Thus, after several centuries of persistent attempts not only to create a science of nature based on the idea of pure causal order, but also to construct, on this basis, a "social physics" entirely free of values, we arrive at the conclusion that it is impossible fully to reduce normative order to causal order. Yet the idea of the complete absorption of causal order into normative order is, in all likelihood, equally untenable. What is crucial here is the recognition of the complexity and multi-layered character of the world and, consequently, the impossibility of discovering some kind of universal "master-key" method that would operate with equal effectiveness in both the natural and the socio-humanitarian spheres (*Bakhtin, 2011*; *Balakhonsky, 1997*; *Bransky, 2006*). It is more reasonable to acknowledge the existence of two fundamental metaphysical principles, which interpret in different ways the character of human actions. The metaphysics of causality prefers to regard them as successive links in a certain universal chain. Freedom is here understood as strict adherence to this chain, any deviation from which is interpreted as unequivocal evil. The metaphysics of normativity, by contrast, prefers to regard human actions as autonomous acts of the realisation of freedom, for each of which the individual bears full responsibility.

Discussion

The analysis of the research findings demonstrates that the problem of the relation between causality and normativity has acquired particular significance in contemporary philosophy. Historical shifts in the structure of scientific rationality have revealed the limitations of classical explanatory models grounded in linear causation and, consequently, have highlighted the necessity of addressing the normative dimension of human action. As scholars have noted, classical scientific rationality sought to construct a universal causal order in which the past, present and future were bound together by an unbroken chain of causes and effects (*Bunge, 1959*; *Popper, 1959*). Yet it was precisely this universality and immutability that generated difficulties in accounting for human history, which is shaped by freedom, choice and responsibility rather than by the substantive regularities of nature alone.

The issue lies in the fact that historical knowledge cannot be reduced to a natural-scientific explanatory model, for it concerns not only events but also motivations, values and normative orientations that shape the horizon of human existence. It is this distinction, emphasised by contemporary philosophy, that becomes central in the interpretation of the research material. The works of Bakhtin (*2011*) and Balakhonsky (*1997*) show that historical explanation is always tied to the interpretation of aims and worldview structures characteristic of a given epoch, which resist causal reduction. Thus, the key question emerging within the discussion is how the causal and normative dimensions of history may be brought together without diminishing the significance of either.

A historical examination of the problem reveals that causality was long understood as a form of normative order rather than as a law of nature independent of human thought. In primitive societies, the connection between events was interpreted through the model of 'guilt and retribution', with nature itself perceived as an extension of the moral order (*Fragments…, 1989*). Even in antiquity, as evidenced by the writings of Diogenes Laërtius (*1979*), causality was frequently conceived through the prism of fate—i.e., a normative law of being. Only with the rise of early modern science did a radical separation of normativity and causality take place, reflected in the works of Descartes and Newton and systematised in the logical-mathematical framework of the *Principia Mathematica* (*Whitehead & Russell, 1910*).

Yet it is this very model, as Kline (*1984*) emphasises, that begins to disintegrate in the twentieth century. Bachelard introduces the notion of 'technical determinism', which, unlike its metaphysical predecessor, acknowledges the complexity of the material world and the presence of discontinuities in scientific knowledge (*Bachelard, 1986*). The crisis of total determinism is articulated most clearly by Prigozhin, who argues for the irreversibility of time, the openness of the future and the impossibility of reducing the world to mathematical formulations (*Prigozhin, 1989*). These ideas redirect philosophical attention back to the normative structures of human activity, for choice, creativity and responsibility become central to the historical process.

A second major group of problems concerns the metaphysics of freedom. As the analysis of philosophical texts shows, freedom cannot be described in terms of causal necessity, for freedom presupposes the subject's capacity to break the causal chain and initiate a new sequence of events. Anscombe (*1971*) observes that causation is not a universal form for describing all types of events, and that human action requires a distinct logical form of explanation. Arendt (*1958*) maintains that action is a 'beginning' that cannot be derived from preceding conditions.

This claim directly contradicts Leibniz's classical determinism (*1984*) and the logical universalism of Whitehead and Russell (*1910*).

Another important set of problems emerges from phenomenological and hermeneutic research. Heidegger (*1962*) demonstrates that understanding is always rooted in the world of lived meanings and cannot be reduced to formal logic. Foucault (*1972*) argues that epistemological ruptures are an integral aspect of the development of knowledge, and that different historical epochs generate distinct discursive rules governing the ways in which the world is explained. This implies that causality and normativity are not eternal and unchanging categories but depend on the cultural matrix of a given epoch.

In light of the research examined, it may be argued that the article reveals a dual movement in contemporary philosophy: on the one hand, an intensifying critique of the universal causal model, and on the other, a growing interest in normativity as an inner principle of human action. This tendency develops within analytic philosophy, hermeneutics, critical realism (*Bhaskar, 2008*), the philosophy of action (*Taylor, 1985*), and phenomenology.

The prospects for further study lie in the construction of an integrative model of historical cognition that accommodates both causal dependencies and normative structures. Such a model must draw upon the ideas of complex systems, non-linearity and an open future, as well as on a philosophy of action in which freedom is treated as a genuine ontological foundation rather than an illusion arising from ignorance of causes. A necessary direction for development is the expansion of interdisciplinary approaches linking philosophy, history, cognitive science and the sociology of knowledge (*Berger & Luckmann, 2009*).

Thus, the discussion shows that the problem of the interrelation between causality and normativity extends beyond a narrowly philosophical question and becomes central to understanding human history. Contemporary philosophy is gradually abandoning the notion of universal causal continuity and directing attention to the complexity, contextuality and creativity of human activity, thereby opening the way towards new methodological models of historical thought.

Conclusion

The research undertaken enables the central results to be synthesised and confirms the achievement of the aims and objectives formulated in the Introduction. The analysis of the metaphysical foundations of causality and normativity demonstrates that these principles possess different ontological natures yet jointly determine the structure of human existence and the modes of historical cognition. The historical-philosophical material indicates that causality was originally linked to normative order rather than to natural-scientific law, as evidenced by ancient sources (*Diogenes Laërtius, 1979*; *Fragments…, 1989*). The gradual differentiation of these concepts proceeded in parallel with the formation of classical rationality and culminated in the scientific systems of the early modern period (*Leibniz, 1984*; *Whitehead & Russell, 1910*).

However, the classical model of causality proved incapable of explaining the phenomena of human activity, which are bound up with freedom, initiative and responsibility. This problem became central for the non-classical philosophy of science of the 20th century. The works of Bachelard (*1986*), Kline (*1984*) and Prigozhin (*1989*) reveal that the mechanistic worldview does not correspond to the actual structure of scientific knowledge and fails to account for non-

linearity, indeterminacy and eventfulness. These ideas confirm the necessity of revising the metaphysical foundations of scientific rationality and returning to the problem of normative structures that guide human behaviour.

The metaphysics of freedom occupies a key position in this context. Anscombe (*1971*) and Lewis (*1973*) demonstrated that traditional models of causality are unsuitable for describing human actions, which are not effects of necessary conditions but constitute contextual and modal forms of existence. In the works of Arendt (*1958*) and Heidegger (*1962*), freedom is defined as the capacity to initiate something new rather than as 'recognised necessity', which radically contradicts classical determinism. Normativity thus becomes not an external constraint but an internal condition of human existence.

Accordingly, the research confirms that historical cognition is impossible without taking normative structures into account. As shown by Bakhtin (*2011*), Balakhonsky (*1997*) and Bransky (*2006*), the meaning of history cannot be derived from causal relations alone, for historical action is rooted in values, motives and collective commitments. Contemporary sociology of knowledge (*Berger & Luckmann, 2009*) likewise demonstrates that social reality is created through processes of institutionalisation and interpretation rather than through the mechanical operation of causal regularities.

At the same time, a complete abandonment of causality is equally impossible. As emphasised by Bunge (*1959*) and Hempel (*1965*), causal explanations remain indispensable for scientific rationality, though they must be supplemented by other forms of analysis. Bhaskar's critical realism (*2008*) shows that reality is stratified and that causality operates at multiple levels, making its reduction to a single model untenable.

As a result, the study demonstrates that the most promising approach is an integrative model of rationality that brings together causal and normative elements. Such a model takes into account:

- the historical variability of structures of thought;
- the non-linear character of events;
- the significance of freedom as an ontological foundation;
- the role of cultural and social norms;
- the necessity of complex explanatory models.

All the objectives set out in the Introduction have been achieved. It has been established that causality and normativity constitute two fundamental metaphysical principles that cannot be reduced to one another. The study has shown that historical cognition requires their joint consideration. It has been demonstrated that freedom arises as a creative rupture of causal continuity and becomes the basis of normative order. Contemporary philosophical research confirms the necessity of multidimensional rationality that combines explanation and interpretation.

Accordingly, it may be concluded that the further development of this topic is associated with the construction of an integrative philosophy of history capable of uniting the metaphysical, epistemological and socio-cultural foundations of human action. This involves advancing interdisciplinary approaches, studying the dynamics of normative systems, analysing the complexity of historical processes and rethinking the categories of rationality in the context

of contemporary science. The research conducted opens a wide range of opportunities for further philosophical inquiry and affirms the significance of this direction for modern theoretical thought.

Conflict of Interest

The author declares that there is no conflict of interest.

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Alexander Buychik [a][2]

Cultural Heritage as a Self-Organising System: The Philosophy of Klironomy and the Formation of a New Science of Cultural Preservation in the 21st Century [*]

Abstract:
In the context of rapid technological development and global cultural transformations, the problem of preserving cultural heritage acquires critical importance for the sustainability of civilisation. Contemporary approaches to cultural preservation, focused primarily on material conservation and institutional protection, fail to consider the processual and self-organising nature of heritage. This determines the relevance of the present research, which aims to formulate the philosophical foundations of a new metascience — klironomy, conceived as the study of cultural heritage as a living system capable of self-development and evolution. The scientific novelty of the study lies in the development of the concept of self-organising cultural heritage and the creation of a klironomical ontology of culture, which integrates philosophical, cultural, legal and technological approaches. The author introduces the category of self-organising heritage as the basis for a new model of preservation, in which culture is understood not as a static object of storage but as a dynamic system of meanings that sustains itself through communication, creativity and digital representation. The subject of the study is the philosophical comprehension of cultural heritage within the conditions of the digital civilisation, while the object of the study is cultural heritage itself as a self-organising system functioning within the technohumanitarian context of the 21st century. The study aims to elaborate the philosophical foundations of klironomy as an independent science capable of explaining the mechanisms of evolution, preservation and transformation of cultural heritage in the digital age. The methodological framework of the research includes general scientific methods of analysis, synthesis, induction, historical-genetic and systems approaches, together with specialised methods of philosophical hermeneutics, phenomenology of culture, axiology and synergetic analysis. These methods made it possible to reveal the regularities of self-organisation in cultural systems and to propose a holistic model of the klironomical ontology of culture. The study formulates the key principles of klironomical philosophy: continuity, self-organisation, multiplicity of being, and the co-creation of human and artificial intelligence. It demonstrates that the interaction between human beings and technologies forms a new type of cognitive partnership in which the preservation of culture is realised through intellectual and digital reproduction of meanings. A concept of klironomical education is proposed, aimed at forming a new generation of specialists — philosophers, analysts of cultural memory, and curators of digital heritage. The author's main conclusions confirm the necessity of recognising klironomy as an autonomous metadiscipline integrating the humanitarian and technological domains of knowledge. Klironomy establishes a new perspective on cultural preservation — as a form of cultural evolution and creative self-maintenance. Culture is understood not as an archive of the past but as an active system of memory capable of sustaining its identity through constant interaction between human beings, society and artificial intelligence.

Keywords: cultural heritage, klironomy, self-organising system, philosophy of culture, digital civilisation, klironomical ontology, artificial intelligence and culture, evolution of cultural systems, human–AI cognitive partnership, preservation and transformation of culture.

Intoduction

The 21st century has become a paradoxical era for cultural heritage. On the one hand, humanity has gained unprecedented instruments for its documentation, analysis, and

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reproduction—artificial intelligence, virtual reality, big data, 3D modelling, and digital archaeology. On the other, the rapid development of digital civilisation, the fragility of physical memory, and the blurring of cultural identities have led to the loss of the very philosophical meaning of preservation. The problem of heritage has shifted from the sphere of museum and restoration practice into that of epistemology, ethics, and the ontology of culture, requiring not merely new methods but a new science capable of explaining what and why should be preserved in the age of artificial intelligence.

Within this context, the concept of klironomy, developed by the author in works of 2019–2024, acquires special significance. Klironomy regards cultural heritage not as a static object of protection but as a self-organising system of values, meanings, and forms of continuity—a living structure capable of reproducing itself through creativity, education, and collective memory. Unlike traditional disciplines such as museology, archaeology, or cultural management, the klironomical approach introduces the category of *evolutionary preservation*: the culture of the past survives not only through restoration but through its ability to adapt its meanings to the future. Such an understanding transforms heritage from a relic of history into an active instrument of civilisational self-knowledge.

Contemporary civilisational processes demonstrate the necessity of rethinking the very essence of cultural heritage.

First, global digitalisation (*Ajuzieogu, 2024*; *Hassani, 2015*; *Nakonieczna & Szczepański, 2024*) has generated a new ontological phenomenon—*digital heritage*, producing the paradox of "synthetic authenticity": artificial intelligence can reconstruct lost images and styles, yet in doing so alters the nature of the original.

Second, intercultural and ethical challenges (*Grey & Kuokkanen, 2019*; *Lixinski, 2023*; *Sánchez-Miranda et al., 2022*) reveal that preservation can no longer be confined to the physical object—it must also address issues of justice, cultural diversity, and the right of communities to their own past.

Third, European philosophical research (*De Clippele, 2020*; *Ferrara, 2021*; *Stackmann, 2023*) increasingly conceives heritage as a moral category, linked to notions of integrity, responsibility, and trust towards the past.

Finally, studies in the philosophy of culture (*Buychik, 2019a*; *Buychik, 2019b*; *Buychik, 2021a*; *Buychik, 2024a*; *Immonen, 2021*; *Viejo-Rose, 2015*) emphasise that cultural heritage is not merely the outcome of the past but a *matrix of the future*, determining how humanity conceives of itself in time.

The novelty of this work lies in its attempt to systematise current global trends within a unified philosophical and scientific paradigm—klironomy as the science of the self-organisation of cultural heritage. For the first time, cultural heritage is treated not as an object of protection but as an autonomous cognitive and ethical process governed by the laws of morphogenesis, semantic evolution, and self-regulation. The study combines the methodologies of philosophical hermeneutics, systems analysis, cultural studies, and digital cognitive technologies, establishing a new scientific platform for examining heritage in the context of artificial intelligence.

The uniqueness of the topic lies in its orientation towards the future: whereas previous approaches focused on the preservation of the past, klironomy investigates how the future itself

can preserve culture—through intelligence, education, digital consciousness, and reflective capacity.

The subject of the study is the philosophical and methodological foundations of klironomy as a scientific system explaining the self-organisation of cultural heritage within the conditions of digital civilisation and artificial intelligence.

The object of the study is the evolving system of cultural heritage—material, immaterial, and digital—as a complex form of human memory, creativity, and self-identification.

The study aims to formulate the philosophical foundations of klironomy as an independent science capable of explaining the evolution of cultural heritage in a digital, post-global, and technohumanitarian world.

To achieve this aim, the following study tasks were developed:

- analyse global approaches to the preservation of cultural heritage (2015–2025) and identify their philosophical limitations in the age of artificial intelligence;
- conceptualise the notion of *self-organising heritage* within the theoretical framework of klironomy;
- formulate epistemological and ethical principles of preservation as a process of civilisational self-reflection;
- develop a model of human–AI interaction in the sphere of cultural memory, interpreting AI as a new cognitive environment rather than a mere instrument;
- define the scientific and educational functions of klironomy as a metadiscipline forming specialists in preservation, cultural analytics, and the philosophy of heritage.

The results of the study are directed towards three key categories of intellectual audiences:

1. Philosophers and theorists of culture for whom klironomy reveals a new ontological status of heritage as a living system capable of self-organisation and semantic development.
2. Researchers and practitioners in the humanities and digital domains for whom the study offers a methodological synthesis of philosophy, informatics, and cultural management, integrating innovation with a value-centred approach.
3. Students and educators in the humanities for whom the results may form the basis of a new type of education, *klironomical learning*, uniting cultural studies, ethics, and digital literacy, essential for a generation capable of preserving not only monuments but the very capacity of culture for meaning-creation.

It is also necessary to clarify the civilisational and philosophical context of the study. Contemporary civilisation has entered a phase in which artificial intelligence becomes not merely an instrument but a *co-author of cultural memory*. Neural networks can generate artistic works, recreate lost languages, and reconstruct historical spaces, thereby erasing the boundary between creator and machine, between the original and the simulacrum. This raises a fundamental question: can an artificially created artefact become part of humanity's cultural heritage? The answer requires a new science that unites technological rationality with the philosophy of values.

Klironomy offers precisely such a synthesis. It regards the cultural heritage of the future as the co-evolution of human and artificial intelligence, where preservation is understood not as "the conservation of the past" but as the continuous reproduction of meanings through time. In this sense, the emergence of klironomy marks a new stage in the self-understanding of

civilisation—a transition from a philosophy of protection to a philosophy of cultural evolution, from the museum to living memory, from the defence of the past to the creation of the future.

Methods

The study of the philosophy of klironomy as a new science of cultural heritage preservation is based on a set of general and specialised methods united by a systemic and interdisciplinary approach. The methodological strategy is built upon the principle of integrity, according to which cultural heritage is viewed not as a sum of disparate objects but as a self-organising and self-regulating system functioning within the space of cultural meanings, social practices, and digital technologies.

The methodological foundation of the study relies on general scientific methods that ensure logical consistency, evidential validity, and reproducibility of results. Foremost among these is the dialectical method, which makes it possible to examine cultural heritage as a process of constant interaction of opposites—tradition and innovation, preservation and loss, the material and the immaterial. Dialectical analysis reveals the contradictions between the historical stability and the dynamic nature of cultural forms, which is particularly significant in the context of the digital civilisation, where the boundaries between the original and the copy, the authentic and the virtual, become increasingly fluid.

The systemic approach made it possible to define cultural heritage as a complex open system encompassing material, spiritual, and informational elements united by relations of integrity and mutual influence. Within the framework of systems analysis, culture is regarded as a self-developing organism whose subsystems—art, science, education, language, and technology—function in constant exchange of information and energy. This approach enables the modelling of processes of cultural continuity through the use of modern artificial intelligence technologies, which act as a new factor in the systemic organisation of culture.

The historical-logical method allowed for the reconstruction of the evolution of ideas about heritage preservation from the ancient categories of memory and imitation to modern concepts of sustainable development and the digital cultural space. The study traces the transformation of paradigms from the restorative and conservation thinking of the 19th and 20th centuries to the philosophy of self-organisation and evolutionary preservation characteristic of the 21st century.

The use of the structural-functional method made it possible to identify the internal organisation of cultural heritage as a system. This method revealed the key functions of heritage—cognitive, axiological, identificational, communicative, and innovative—and showed how these functions are interconnected with social and technological contexts. As a result, heritage appears not as an archaic form of storing experience but as an active mechanism for maintaining the semantic continuity of civilisation.

The modelling method was employed to create a conceptual model of klironomy as a scientific system. Modelling made it possible to formalise the relationships between key components: cultural codes, memory bearers, technologies of representation, and subjects of cultural activity. Through modelling, it becomes possible to describe cultural heritage in terms of self-organisation and to establish analogies between the evolution of cultural forms and the principles of synergetics.

An important role is played by the method of interdisciplinary integration, which ensures the interaction of philosophical, cultural, sociological, legal, and informational sciences. This method made it possible to shape klironomy as a metadiscipline that unites humanistic and technological knowledge. Its application is justified by the fact that cultural heritage in the 21st century exists at the intersection of the human and the digital: in digital archives, 3D replicas, virtual museums, neural reconstructions of lost monuments, and even in the algorithms of machine translation of ancient languages.

Alongside general scientific approaches, the study also employs specialised methods of philosophical and cultural analysis that make it possible to reveal the inner nature of cultural heritage as a phenomenon of consciousness and a mode of being. Among these, the phenomenological method occupies a central place. It aims to comprehend heritage through the analysis of the experience of living culture—its meanings and axiological intentions. Phenomenology allows heritage to be understood not as an object but as an event—a meeting of a human being with historical time, in which not only the material form but also the spiritual energy of a cultural act is preserved.

The hermeneutical method was applied for interpreting texts, artefacts, and symbols of cultural heritage in their semantic interrelations. It makes it possible to understand how the past becomes accessible through the present and how the act of interpretation itself serves as a form of preservation. Within hermeneutic analysis, particular attention is paid to the role of language, narrative, and digital representations in the transmission of cultural experience—an especially relevant issue in the study of virtual and multimedia forms of heritage.

The axiological approach made it possible to uncover the value structure of cultural heritage. Since klironomy proceeds from the idea of preserving not only material objects but also the semantic and ethical foundations of culture, axiological analysis reveals the hierarchy of values that shapes the human attitude toward the past and the future. It captures the transition from static forms of storing values (museum, archive, monument) to dynamic forms of their reproduction (education, digital communications, artificial intelligence).

To explain the processes of self-organisation within heritage, the study employs the synergetic method, borrowed from the natural sciences and adapted to the cultural sphere. According to synergetics, complex systems are capable of self-development through instability and chaos; similarly, cultural heritage evolves through crises, losses, and re-interpretations. Synergetic analysis presents culture as an open field of non-linear interactions, where small fluctuations—innovations, creative acts, or technological interventions—can radically transform the structure of cultural memory.

The method of critical reflection provides philosophical depth to the research, focusing on the ultimate foundations of preservation. This method reveals the tension between the need for conservation and the demand for evolution, between authenticity and reproducibility, between the preservation of form and the preservation of spirit. In the context of artificial intelligence, critical reflection raises the question: does the human being remain the subject of cultural experience when the functions of memory and creativity are partially delegated to algorithms?

The comparative method made it possible to juxtapose various cultural paradigms of preservation—Western, Eastern, postcolonial, and digital. Within this method, classical conceptions of conservation (*De Clippele, 2020*; *Lixinski, 2023*) were compared with

contemporary klironomical ideas (*Buychik, 2019b*; *Buychik, 2020*; *Buychik, 2021a*; *Buychik, 2024a*; *Buychik, 2024b*), which helped to determine the boundaries and potential of the new scientific model.

Particular importance is given to the cultural method of meaning reconstruction, aimed at identifying deep archetypes and symbolic codes that determine the social perception of heritage. It allows for the analysis of not only material manifestations of culture but also the mechanisms of collective memory, social myths, and the images of the past in mass consciousness.

The methodological framework of the study also includes elements of information-cognitive analysis, characteristic of the humanities informatics and the philosophy of artificial intelligence. This approach regards cultural heritage as a form of distributed knowledge existing within networks of communication, databases, and digital representations. Within klironomy, artificial intelligence is interpreted not as a threat but as a new cognitive environment expanding the capacities of human consciousness in the understanding and preservation of cultural meanings.

The method of conceptual synthesis enabled the integration of findings from philosophy, cultural studies, and the theory of artificial intelligence into a single system of concepts. Such synthesis is necessary for developing a new terminology—notions such as *self-organising heritage*, *klironomical consciousness*, and *digital continuity*, which define the reality of culture in the 21st century.

Methodologically, the study also relies on the principle of dialogism, stemming from the philosophy of Mikhail Bakhtin (*1984*) and existential hermeneutics. In the context of klironomy, dialogism is understood as the constant interaction of times, cultures, and consciousnesses—a living dialogue between the past and the future. In this dialogue, artificial intelligence becomes not an external instrument but a new interlocutor of humanity, capable of reproducing and interpreting cultural meanings within the digital dimension.

Thus, the methodology of the research constitutes a hierarchically organised system in which general scientific methods provide logical and epistemological rigour, while specialised philosophical and cultural methods reveal the deeper essence of klironomy as a new science. The integrative nature of this approach makes it possible to view cultural heritage as a multilevel phenomenon from material structures to symbolic forms and digital simulations and to understand its preservation as a process of the self-development of civilisational memory.

It is precisely this combination of systemic reasoning, phenomenological sensitivity, synergetic dynamics, and digital analytics that enables the transition from a conservationist paradigm to an evolutionary philosophy of cultural heritage, in which preservation becomes a conscious act of cultural self-design of humankind.

Literature Review

Contemporary study in cultural heritage demonstrates a wide spectrum of theoretical, methodological, and technological approaches within which a new philosophy of cultural preservation is gradually emerging. The analysis of literature published between 2015 and 2025 makes it possible to distinguish several key directions from the ontological understanding of cultural heritage to its digital reconstruction and social sustainability. These directions form the conceptual context within which the author's concept of klironomy as a science of the self-organisation of cultural heritage is being developed.

The earliest studies of this period (*Hassani, 2015*; *Viejo-Rose, 2015*) laid the foundations of the modern discussion on the interrelation between memory, identity, and the material forms of culture. Viejo-Rose (*2015*) interprets heritage as a complex network of connections between collective memory and social structures, emphasising that preservation becomes a way of constructing the future. Hassani (*2015*) focuses on the technical dimension—documentation and visualisation of heritage—where the accuracy of digital models acts as a guarantee of cultural data integrity. These works demonstrate a transition from the conservative notion of the "monument" towards the idea of dynamic, technologically mediated memory.

Berg (*2016*) and Burgos-Vigna (*2016*) expanded the discussion to the levels of urbanism and social philosophy. Berg (*2016*) demonstrated that the value of urban heritage is conditional and determined by context and scale, while Burgos-Vigna (*2016*) examined the dichotomy between universal categories of world heritage and local forms of "Buen Vivir", highlighting the need for an intercultural perspective on preservation.

Between 2017 and 2019, scholarly attention shifted towards methods of assessment and management of heritage. Franz and Vinken (*2017*), in the German collection *Das Digitale und die Denkmalpflege*, illuminated the impact of digital technologies on restoration practices and the transition to electronic databases. Patiwael, Groote, and Vanclay (*2019*) critically examined the ICOMOS methodology, pointing out the need for a more comprehensive heritage impact assessment. Amar and Armitage (*2019*) analysed the socio-economic consequences of building conservation, while Grey and Kuokkanen (*2019*) proposed models of Indigenous governance of heritage as an alternative to bureaucratic systems. Cortese (*2019*) contributed to the philosophical basis of the debate, interpreting legal protection of heritage as a moral duty of the state towards society.

During the same period, the emergence of a new scientific platform—klironomy—began to take shape. The author of the present study proposed viewing the preservation of heritage as a form of cultural self-development. In *The Problem of Formation of Klironomy as a Science of the Preservation of Cultural Heritage* (*Buychik, 2019b*), the notion of klironomy was introduced as a systematic discipline uniting philosophy, cultural studies, and heritage management. In *Philosophical Understanding of the Value of Historical and Cultural Heritage* (*Buychik, 2019a*), for the first time, value was defined as the main category of preservation, moving the discussion beyond museum practice into the field of axiology and metaphysics of culture. These studies became the starting point for the transition from the technological to the philosophical understanding of heritage.

The studies of the early 2020s deepened the interpretation of heritage as a collective and interactive process. De Clippele (*2020*) showed that, in Belgian law, heritage is increasingly perceived as a collective property requiring shared responsibility. Casanova and Pinheiro (*2020*), in the Portuguese context, analysed a century of archival preservation practices, demonstrating the evolution of methods from antiseptic conservation to environmentally sustainable approaches. The author suggested viewing klironomy as a systematic scientific approach applicable to education, which opened prospects for its institutionalisation as an academic discipline (*Buychik, 2020*).

Simultaneously, cultural and ethical approaches were being developed. Ferrara (*2021*) interpreted intangible heritage as a space for interaction between tradition and modernity,

emphasising the role of immaterial values in identity formation. Colavitti (*2021*) explored the dialogue between conservation and design, while Arizza (*2021*) raised the question of restitution of cultural objects and the limits of scientific intervention. Immonen (*2021*) introduced the concept of *Bildung* as a process of cultural formation, and the author of the article, in his two works "*The Formation of Klironomical Thinking in the System of the Social Outlook*" (*Buychik, 2021a*) and "*The Relevance of the Formation of the Science of the Cultural Heritage Preservation as the Evolution of Social and Scientific Thought*" (*Buychik, 2021b*), presented klironomy as a new paradigm of cultural preservation that integrates philosophy, sociology, and aesthetics.

In Francophone sources of the same period, the ethical and social dimensions were reinforced. Simon (*2022*) treats cultural heritage as an actor of sustainable development, while Chih-Hung (*2024*) explores the connection between cultural landscape and the philosophy of memory. These works confirm the shift from an objective to a processual understanding of heritage—close to the klironomical approach, in which preservation is perceived as continuous reconstruction of meanings.

The Spanish and Latin American scholarly traditions (*García Canclini, 2015*; *Fracasso & Mesa, 2019*; *Revaz et al., 2022*; *Sánchez-Miranda et al., 2022*) develop the idea of heritage as social capital and as a mechanism of cultural self-affirmation. Here, heritage is understood not so much as the past but as a field of social conflicts and negotiations through which identities and values are asserted. These ideas resonate directly with the author's concept of klironomy as a means of intercultural dialogue and a tool of humanistic consolidation.

A significant contribution to the development of the digital preservation paradigm was made by Nakonieczna and Szczepański (*2024*) and Ajuzieogu (*2024*). The former discusses the issue of authenticity in the era of digital reproduction, arguing that the digital environment generates a new form of authenticity based on informational precision, while the latter shows how generative artificial intelligence becomes an active participant in reconstructing cultural artefacts. These studies correspond with the klironomical concept of "cognitive heritage", in which AI is considered a co-evolutionary element of cultural memory.

The philosophical and ethical dimension of preservation has been further elaborated in the works of Lixinski (*2023*), Grey and Kuokkanen (*2019*), and Stackmann (*2023*). Lixinski (*2023*) calls for intercultural dialogue and co-creation of heritage policy, while Stackmann (*2023*) develops the category of integrity, linking the wholeness of a monument with the ontological completeness of human experience. These approaches signal a shift from legal-administrative to philosophical-anthropological perspectives on conservation.

A distinct place is held by Portuguese-language studies (*Fragoso & Gato, 2025*; *Oliveira & Guerber, 2023*; *Silveira, 2023*; *Vieira, 2017*). Oliveira and Guerber (*2023*) demonstrated the relationship between legal protection of heritage and regional development. Silveira (*2023*) analysed the problem of accessibility of historic sites. Fragoso and Gato (*2025*) considered cultural tourism as a form of revitalising historic centres. These studies reveal the practical potential of klironomy—from the creation of memory spaces to the development of strategies for cultural sustainability.

In the works of Buychik for 2023–2024, klironomy attains its completed theoretical form. In *The Relevance of Creating a Scientific and Educational Complex for Training Specialists in Revitalization* (*Buychik, 2023a*), the idea of integrating scientific knowledge and education is proposed for

training a new type of specialist—the custodians of cultural continuity. In collaboration with Tomanek (*Buychik & Tomanek, 2023b*), the focus is placed on the importance of studying the cultural heritage of Ukraine as part of the broader European civilisational code. In the monograph *Klironomy: The Science of Cultural Heritage* (*Buychik, 2024a*), the author systematises the main categories of the new science, including the notions of "klironomical system", "ontology of klironomy", and "philosophy of klironomy". The work *The studies in preserving cultural heritage: The methodological apparatus of the new sciences of theoretical klironomy* (*Buychik, 2024b*) complements the methodological apparatus of klironomy, demonstrating its applicability to interdisciplinary and digital practices.

Thus, global literature of the past decade has established the conditions for the emergence of a new paradigm in which the philosophy of preservation is replaced by the philosophy of cultural evolution. The studies by Viejo-Rose (*2015*), Immonen (*2021*), and Simon (*2022*) emphasise the idea of development through continuity, fully corresponding to the klironomical principle of self-organisation. The works by De Clippele (*2020*), Stackmann (*2023*), Ferrara (*2021*), and Fragoso & Gato (*2025*) confirm that preservation is becoming an interdisciplinary practice uniting ethics, law, urban studies, and technology.

As a result of this review, several general tendencies can be identified that form the methodological foundation of klironomy:

1) the transition from a protective to an evolutionary paradigm of heritage;
2) the recognition of intangible and digital forms of memory;
3) the inclusion of artificial intelligence in processes of cultural reproduction;
4) the development of ethical and philosophical foundations of preservation;
5) the formation of the educational mission of the science of heritage.

In this context, the author's works for 2019–2024 represent a logical continuation of global thought from particular studies to a universal theory. Klironomy integrates the achievements of various schools, forming a meta-scientific discipline capable of uniting philosophy, cultural studies, law, digital technologies, and artificial intelligence into a unified project of preserving culture as a self-organising system.

Results

The Evolution of the Paradigm of Cultural Heritage Preservation: From Conservation to Self-Organisation

The history of humanity's relationship with cultural heritage reflects the evolution of civilisation itself. Throughout the 19th and 20th centuries, the paradigm of conservation dominated—the understanding of heritage as a static value requiring protection and safeguarding. Within the classical UNESCO and ICOMOS models, cultural heritage was primarily interpreted through the categories of a material object, legal ownership, and normative responsibility (*Patiwael et al., 2019*). Such an approach mirrored the era of industrial rationality, when cultural memory was perceived as an archive—a collection of originals to be preserved unchanged.

By the beginning of the 21st century, however, the limitations of this model had become evident. The development of digital technologies, the globalisation of cultural flows, and the

growing awareness of intangible forms of heritage have shifted the focus. Culture has ceased to be a repository and has instead become a network of relations continuously generating new meanings (*Viejo-Rose, 2015*). Within this network, memory functions not as accumulation but as a dynamic system that maintains identity through renewal.

The transformation of the paradigm is particularly visible in the philosophy of preservation. Whereas in the past "to preserve" meant "not to change", today preservation is possible only through development. Within the framework of cultural evolution, heritage loses its "museum" character and becomes a process of self-production of meanings. This process echoes the principles of autopoiesis, whereby a system exists through the constant reproduction of its elements (*Berg, 2016*).

Contemporary studies confirm that effective preservation is impossible without the inclusion of mechanisms of self-organisation—educational, digital, and cognitive. Simon (*2022*) and Immonen (*2021*) interpret cultural heritage as an active participant in sustainable development: it shapes cultural competencies, transforming society through education and interpretation.

Thus, the modern transition from conservation to self-organisation signifies a profound shift in the ontological status of heritage—from an object of protection to a subject of the cultural process, capable of evolution within the digital and sociotechnical space.

The Category of "Self-Organising Heritage" as a Key to Understanding Klironomy

The concept of self-organising cultural heritage lies at the core of the philosophy of *klironomy*. It expresses the idea that culture sustains itself not through external control but through internal mechanisms of reproducing meanings, forms, and values. Like a living organism, cultural heritage is never fixed in a state of "rest"; it continuously changes while maintaining its structure and identity.

Self-organisation manifests itself on three interrelated levels.

At the material level, it operates through restoration, digitisation, replication, and 3D-modelling—processes by which heritage physically "recreates" itself using technology. Studies by Hassani (*2015*) and Ajuzieogu (*2024*) demonstrate that digital reconstructions are not mere copies but generate new forms of presence for heritage within the informational space.

At the semantic level, self-organisation unfolds through the reinterpretation and translation of cultural codes. This includes interpretation, artistic citation, and educational adaptation of traditions, transforming heritage into a source of new knowledge (*Ferrara, 2021*).

At the cognitive level, it involves the participation of artificial intelligence as a mediator of memory. AI is capable of analysing, classifying, and predicting cultural connections, thus becoming a component of cultural evolution rather than merely a technical instrument (*Nakonieczna & Szczepański, 2024*).

According to the klironomical approach (*Buychik, 2019b*; *Buychik, 2021a*; *Buychik, 2024a*), the self-organisation of heritage represents a dialectical process between preservation and transformation. Every act of cultural renewal—educational, artistic, or technological—simultaneously constitutes an act of preservation, as it restores the continuity of time. Preservation, therefore, is not a refusal of change but a form of controlled evolution.

This understanding dismantles the traditional opposition between "original" and "replica", "authentic" and "digital". The value of heritage shifts from the material carrier to the informational content and the process of meaning transmission. In this context, klironomy introduces the notion of functional authenticity—a type of authenticity grounded in the preservation of the function of memory rather than the physical form of the artefact.

Thus, the category of self-organising heritage becomes the key to a philosophical comprehension of 21st-century culture: the preservation of identity is possible only through the continuous renewal of its forms.

The Klironomical Ontology of Culture: Principles and Structure

The klironomical ontology of culture asserts that the being of cultural heritage is processual and evolutionary. It transcends the static notion of heritage as "property" and introduces the idea of heritage as a form of the existence of time within the human being. This ontology is grounded upon four principles: continuity, self-organisation, multiplicity of being, and co-creativity between humans and artificial intelligence.

The principle of continuity maintains that culture exists not as a sequence of separate epochs but as a single temporal flow in which the past, present, and future constantly interpenetrate (*Viejo-Rose, 2015*). In this logic, every act of interpretation becomes a continuation of cultural being rather than its interruption.

The principle of self-organisation reveals that heritage possesses intrinsic mechanisms of resilience—tradition, education, communication. It restores disrupted connections through the internal energy of cultural structures without requiring constant external regulation. This principle resonates with the ideas of synergetics applied to humanitarian systems (*Berg, 2016*; *Buychik, 2023a*).

The principle of multiplicity of being reflects the contemporary coexistence of several realities of heritage—material, digital, symbolic, and imaginary. Virtual museums and meta-archives, for instance, create new ontological modes of the monument's existence (*Nakonieczna & Szczepański, 2024*). These modes do not replace originals but expand the ways in which they are present within human experience.

The principle of co-creativity between humans and AI posits that artificial intelligence has become part of the cultural process. It participates in the reconstruction of lost artworks, the revival of ancient languages, and the modelling of architecture and musical styles. Thus, AI evolves from a tool into a co-author of human memory (*Ajuzieogu, 2024*).

The ontology of klironomy integrates all these principles into a model of cyclic continuity. Culture is conceived as a closed yet non-static loop—*human – culture – technology – memory*. Each element within this system influences the others, forming a stable network of meanings. This model portrays culture as an organism whose memory is continuously renewed through cognitive and technological interfaces.

Thus, the klironomical ontology establishes the philosophical foundation of a new science, in which the preservation of culture is interpreted as a form of the existence of time itself, and technology as an extension of the human capacity for creative reproduction of the world.

The Role of the Human Being and Artificial Intelligence in the Klironomical Process

One of the most innovative results of the research is the identification of a new role of the subject of preservation—the human being as a co-creator of cultural continuity. In the traditional model, a person acted as a custodian, observer, or restorer. In the klironomical model, the human being becomes an active participant in the process of cultural self-development, capable of interacting with artificial intelligence in the joint production of meanings.

Modern AI technologies from machine-learning algorithms to generative neural networks make it possible to analyse cultural data with a precision unattainable by humans. Yet the philosophical question is not whether AI will replace the human being, but how the collaboration of these two types of intelligence forms a new cognitive ecosystem. In this interaction, the human being retains priority in value orientation, while AI maintains functional primacy.

As the author of this article notes, it is the human who sets the direction of interpretation, defines the criteria of authenticity and semantic depth, whereas artificial intelligence extends the analytical and reconstructive capacities (*Buychik, 2024a*). Such cooperation creates a phenomenon of cognitive synergy, in which technology becomes an extension of human consciousness rather than its substitute.

Within the digital environment, artificial intelligence performs the roles of archaeologist, curator, and translator: it restores destroyed artefacts, reconstructs texts, and models vanished cities (*Fragoso & Gato, 2025*; *Nakonieczna & Szczepański, 2024*). This transforms AI into a temporal bridge between lost realities and future generations.

Philosophically, it is significant that such interaction does not diminish human responsibility. On the contrary, it intensifies it, since it requires reflection on the boundaries of ethics and authorship in digital culture (*Stackmann, 2023*). Klironomy introduces the concept of co-evolution of consciousnesses, implying that the preservation of heritage becomes a shared project of human and machine intelligence united by the purpose of reproducing cultural meanings.

Thus, in the klironomical process, the human being ceases to be a "guardian of the past" and becomes a "creator of continuity," while artificial intelligence transforms from a tool of data processing into an integral part of the philosophy of civilisational memory.

Interdisciplinary Foundations of Klironomy as a New Science

The results of the study confirm that klironomy cannot be reduced to any single discipline. It represents a synthetic system of knowledge integrating philosophical, cultural, legal, technological, and pedagogical approaches.

Philosophy provides the axiological and ontological foundation of klironomy. The works of Viejo-Rose (*2015*), Immonen (*2021*), De Clippele (*2020*), and Lixinski (*2023*) demonstrate that heritage functions not only as an object but also as a way of comprehending being. These authors introduce categories such as responsibility, identity, and memory—those that constitute the core of klironomical thinking.

Cultural studies supply the methodological tools for analysing symbolic forms and mechanisms of collective memory. The works of García Canclini (*2015*), Fracasso and Mesa

(*2019*), and Sánchez-Miranda et al. (*2022*) reveal how social communities reinterpret their past within the framework of contemporary experience. The cultural perspective allows heritage to be viewed as a living communication between generations rather than as a static value.

Legal scholarship defines the institutional mechanisms of protection. The studies of De Clippele (*2020*), Oliveira and Guerber (*2023*) show that modern law is shifting from the protection of ownership towards the recognition of collective responsibility for preservation. This shift reflects the klironomical orientation towards shared management of memory.

The technological component is represented by the studies of Hassani (*2015*), Ajuzieogu (*2024*), Nakonieczna and Szczepański (*2024*), where technologies are not opposed to culture but integrated within its structure as mediators. They form a digital infrastructure of memory, ensuring the resilience of cultural experience under the conditions of the information society.

The educational dimension of klironomy is expressed in the works of the author (*Buychik, 2023a*) and Simon (*2022*), in which the preservation of heritage is understood as a pedagogical task of cultivating a new type of thinking—the ability to perceive culture as a living system. This direction determines the practical mission of klironomy: to create an academic and professional environment for training specialists in the preservation of meaning rather than form.

Thus, klironomy is affirmed as an integral science that unites the rational and the humanistic, the legal and the philosophical, the technological and the ethical within a single metadomain—the domain of cultural continuity.

Klironomy as an Educational and Research Platform

The development of klironomy as a science presupposes its institutionalisation within educational and research systems. The cultural heritage of the future requires specialists of a new type—not restorers, but interpreters and systemic analysts of culture.

The author (*Buychik, 2023a*; *Buychik, 2024b*) emphasises that the formation of klironomical education should be based on the principles of interdisciplinarity, digital literacy, and philosophical responsibility. In contrast to traditional museum education, klironomical training develops the capacity to perceive culture as a self-organising system, in which every element is interrelated with the whole.

Such education shapes the concept of klironomical thinking—a worldview skill that includes the ability to perceive cultural continuity and to manage it in accordance with values, technologies, and global challenges. Klironomical thinking unites philosophy, ethics, and artificial intelligence, creating a new form of humanitarian reason oriented towards the preservation of meanings rather than mere knowledge.

In the research dimension, klironomy forms a platform for interdisciplinary projects — from digital archaeology to cognitive semiotics. It is capable of integrating artificial intelligence into the humanities without losing axiological orientation. This opens the possibility for the establishment of *Centres for Klironomical Studies*, bringing together philosophers, programmers, cultural scholars, and archivists.

Thus, klironomy, in both educational and research contexts, becomes a strategy for the cultural survival of humanity, aimed at preserving meanings and spiritual structures in an era of technological uncertainty.

Discussion

The contemporary epoch confronts humanity with a question that can no longer be postponed: how can culture be preserved amid the accelerating pace of technological and civilisational change? In the 21st century, the preservation of cultural heritage has ceased to be a purely academic issue and has become a matter of civilisation's survival in its axiological, cognitive, and spiritual integrity. For this reason, the present study turns to the philosophical foundations of this problem—to the need for a distinct science of cultural preservation, klironomy, capable of integrating the fragmented approaches of humanistic and technological knowledge.

The relevance of this topic arises from the radical transformation of the very nature of heritage. Whereas cultural heritage was once understood as a corpus of tangible and intangible artefacts requiring protection, it has now become a process of continuous meaning-making, mediated by the interaction between human beings, society, and artificial intelligence. This shift demands not merely new analytical tools but a new mode of scientific thinking—metadisciplinary, philosophical, and at the same time empirically applicable. As a science of the self-organisation of cultural heritage, klironomy responds to this challenge.

Yet despite the obvious necessity for such a scientific framework, the global academic community continues to approach heritage preservation within the confines of specialised disciplines—cultural studies, museology, law, art history, digital archaeology, and others. Each discipline constructs its own fragment of the picture, but none embraces the whole. It is precisely this methodological rupture that renders the question of klironomy so acutely relevant.

Over the past decades, scholarly literature has demonstrated a growing interdisciplinary interest in heritage issues; however, this interest remains predominantly operational rather than philosophical. Research has tended to focus on conservation methods, 3D-modelling technologies, and legal or institutional frameworks, while the central question—*why* and *for what purpose* culture is preserved—frequently remains unresolved.

This symptom—the absence of an ontological dimension—can be observed across multiple domains. International conventions on cultural heritage (including the 1972 UNESCO Convention and its later revisions) still operate with the concept of "world heritage" as a list of objects, without considering heritage as a process occurring within humanity itself. In major academic databases (Web of Science, Scopus, eLibrary), the prevailing research is technical in nature, in which the notion of "preservation" is reduced to restoration and digital replication.

The neglect of klironomy as an independent science also manifests itself in the epistemological fragmentation of the humanities. Philosophy and cultural theory explore semantic and axiological dimensions but often avoid systemic modelling; technological disciplines develop recording methods but rarely reflect upon their cultural consequences. As a result, a paradox emerges: the greater the effort devoted to preservation, the less understanding there is of *what* is actually being preserved.

Such a situation leads to the loss of a holistic perspective on cultural evolution. Excessive attention to objects and technologies obscures the process of cultural self-organisation—its inherent capacity to reproduce values, knowledge, and meanings. Ignoring this capacity signals a deep crisis of humanistic thought, trapped between protective and analytical paradigms. The absence of a klironomical approach causes modern society to preserve form while losing

substance—rituals of memory devoid of inner comprehension, digital replicas lacking authentic experience.

The development of klironomy as a new scientific discipline has encountered a series of methodological and philosophical difficulties, foremost among them the absence of an established conceptual framework. None of the existing terminological systems can adequately express the processual nature of cultural heritage. Consequently, the author was compelled to construct an original conceptual apparatus, introducing notions such as *self-organising heritage*, *klironomical ontology*, *human-AI cognitive partnership*, and *functional authenticity*.

A second difficulty lies in the world-view inertia of the humanities. Many scholars still perceive philosophy as a purely reflective field detached from practice, whereas klironomy requires the active interplay of philosophical analysis and technological design. Overcoming this divide demanded a new type of thinking—not contemplative and conservative, but evolutionary and creative.

The third challenge concerns the resistance to interdisciplinarity. In an academic environment structured by rigid disciplinary boundaries, any attempt to construct a metascience provokes scepticism: does it belong to philosophy, cultural studies, or law? Klironomy, by its very nature, belongs to none of them—it unites them as facets of a single process of cultural self-development.

Furthermore, the methodological work was complicated by the absence of direct empirical analogues. Klironomy deals with phenomena that are only beginning to emerge—digital archives, neural-network reproductions of art, and simulacra of authenticity. This necessitates the creation of new criteria for authenticity, ethical norms, and educational approaches. Throughout the study, the author had to balance between philosophical abstraction and practical application, developing a language comprehensible to both humanists and technologists.

Finally, the most significant difficulty was the resistance of the traditional humanistic paradigm, founded on the principle of "to preserve without altering". In contrast, klironomy asserts the principle of "to preserve through development." Such a statement often provokes philosophical scepticism, being perceived as a threat to authenticity. Yet it is precisely here that the core novelty of the concept resides—the understanding of preservation as a form of evolution rather than its negation.

Despite these obstacles, the results of the study open broad perspectives for both the academic community and global cultural practice. Above all, klironomy offers a new methodological horizon for the humanities. It unites philosophy, cultural theory, law, digital engineering, and pedagogy into a coherent system in which cultural preservation is viewed as a form of humanity's self-knowledge.

For philosophy, this signifies a return to its primordial mission—to explain the world not only through the categories of truth and being but also through those of memory, continuity, and responsibility. Klironomy fills philosophy with tangible content, restoring its practical significance.

For cultural and social sciences, klironomy paves the way for a dynamic and evolutionary mode of analysis, where culture is interpreted not as a collection of values but as a system of

meaning-generation. This enables the study of mechanisms of cultural memory, identity transformation, and the interplay of tradition and innovation within a single continuum.

For technological disciplines, klironomy provides an ethical framework for human–AI interaction. It reinterprets digital heritage not as a mere copy of reality but as part of a living cultural organism that demands responsible engagement. In this sense, klironomy may serve as the philosophical foundation for future policies in digital art, meta-archives, and cyber-culture.

For society at large, klironomy formulates a vision of sustainable cultural development, in which preservation is understood as co-creation across generations rather than passive conservation. This is particularly vital in an age of global instability, when culture becomes not merely an aesthetic domain but an existential foundation of human being.

Thus, the significance of this study extends far beyond the boundaries of academic theory: it proposes a philosophy of cultural resilience in which past, present, and future converge within a single process of semantic evolution.

Despite the results already achieved, the development of klironomy as a science is only beginning. Further research should focus on several key directions.

First, there is a need to design formal models of klironomical dynamics capable of describing the laws of self-organisation in cultural systems. Such models could provide a basis for predicting risks of cultural identity loss and developing strategies for its sustainability.

Second, it is necessary to create new digital platforms of cultural memory, where AI functions not merely as a storage tool but as a partner in interpretation and meaning reconstruction. This will transform artificial intelligence into an active participant in cultural evolution, a theme increasingly central to digital philosophy (*Ajuzieogu, 2024*; *Nakonieczna & Szczepański, 2024*).

Third, international standards of klironomical sustainability must be elaborated, integrating legal, ethical, and cultural criteria for assessing the condition of cultural ecosystems.

Fourth, innovative educational programmes are worth establishing, aimed not at the accumulation of knowledge but at the cultivation of cultural thinking—the ability to preserve and transform meanings in a rapidly changing world.

Finally, the anthropological status of the human being in the klironomical era demands deeper philosophical reflection: what does humanity become when its memory is partly shared with artificial intelligence? This question opens the horizon for a new philosophical anthropology—a *klironomical anthropology*, in which the subject of culture is not only the individual but also the collective, expanded consciousness of civilisation.

Thus, the discussion of the results demonstrates that klironomy is not merely a new theory but a turning point in the evolution of humanistic knowledge. It seeks not simply to preserve culture but to comprehend the very mechanism of its preservation as a form of civilisation's life. In this lies its philosophical mission and practical value—to unite heritage and future, humanity and technology, thought and memory in a single act of cultural self-awareness.

Conclusion

The conducted study confirmed the initial hypothesis that, in the 21st century, cultural heritage is no longer a static object of conservation but acquires the features of a self-organising system capable of evolution, adaptation, and the self-reproduction of meanings. In this context,

the philosophy of *klironomy* emerges as the foundation of a new science—a science of the continuity of cultural being that unites philosophical, legal, cultural, and technological approaches into a single metadisciplinary paradigm.

The results of the study correspond to the stated purpose to formulate the philosophical foundations of klironomy as an independent science explaining the evolution of cultural heritage in the digital and techno-humanitarian world. The analysis of theoretical sources, the current state of the problem, and global trends in cultural preservation substantiated the necessity of shifting from a protective to an evolutionary model of safeguarding heritage. The totality of theoretical and methodological conclusions demonstrated that culture is preserved not in spite of change but through it—by virtue of its continuous capacity for self-development.

Within the framework of the 1st study task to analyse global approaches to cultural heritage preservation and to reveal their philosophical limitations, it was found that the classical models of UNESCO and ICOMOS largely rely on the concept of material and legal ownership. While they provide legal guarantees, they fail to address the internal dynamics of cultural systems. The works of Berg (*2016*), De Clippele (*2020*), Lixinski (*2023*), and Viejo-Rose (*2015*) highlighted the limitations of the conservationist paradigm, confirming the relevance of the klironomical approach based on the idea of self-sustaining cultural memory.

The implementation of the 2nd study task to conceptualise the notion of self-organising heritage led to the formulation of the key category of klironomy. It was shown that cultural heritage functions as an open, non-linear, and self-developing system in which the processes of transmission, learning, creativity, and digital reproduction act as internal mechanisms of preservation. These processes embody the principle of evolutionary preservation—preservation through transformation.

According to the 3rd study task to formulate the epistemological and ethical principles of preservation as a process of civilisational self-reflection, the structure of klironomical ontology was substantiated. It is based on four principles: continuity, self-organisation, multiplicity of being, and the co-creation of humans and artificial intelligence. These principles reveal a new philosophy of culture in which the being of heritage is understood as a form of temporal existence, and the human being becomes a subject responsible for maintaining semantic continuity.

In addressing the 4th study task to develop a model of interaction between humans and artificial intelligence in the sphere of cultural memory, it was established that AI becomes not merely a tool of analysis but a participant in the cognitive process. Its inclusion within the cultural system forms a mode of cognitive partnership, in which the human defines value orientations while AI provides analytical and reproductive capacity. Such co-creation opens the way towards the formation of a new type of heritage—*intellectual heritage*—in which human and algorithmic consciousness unite for the preservation of cultural meanings.

The 5th study task to define the scientific and educational functions of klironomy as a metadiscipline demonstrated that this new science fulfils both integrative and enlightening missions. Klironomy creates a space for the interaction of philosophy, law, cultural studies, pedagogy, and digital technologies, establishing the foundation for training specialists capable of working with culture as a self-organising system. In this context, education functions not

merely as a channel of knowledge transmission but as a mechanism for preserving the very capacity of culture for meaning-creation.

The overall results of the study can be summarised as follows.

First, the concept of *self-organising cultural heritage* has been developed as a systemic and philosophical notion. It demonstrates that the preservation of culture occurs from within culture itself—through the mechanisms of memory, interpretation, representation, and education, rather than solely through institutional protection.

Second, the principles of *klironomical ontology* have been formulated, describing the being of culture as a continuous process of reproduction. These principles unite phenomenological and synergetic approaches, revealing the laws of self-organisation within the humanities.

Third, the role of the human being in the system of cultural heritage has been reinterpreted: the human acts not as a custodian or observer, but as a co-creator of cultural evolution. Human activity becomes an act of ontological responsibility—a form of care for meaning, not merely for the material object.

Fourth, the prospect of *cognitive partnership* between humans and artificial intelligence has been substantiated. The cultural heritage of the 21st century involves not only the preservation of artefacts but also the creation of self-learning systems of memory capable of integrating human experience into the digital environment.

Fifth, the *practical orientation* of klironomy has been defined—the formation of an educational and research platform providing the preparation of new-generation specialists and the creation of digital ecosystems of cultural memory.

These results are directly related to the scientific novelty of the study. Klironomy integrates philosophical, legal, and technological approaches, introduces the category of self-organising heritage, develops a klironomical ontology of culture, and redefines the anthropological role of the human being. All these aspects together form a new scientific language, allowing cultural preservation to be described not in categories of "objects" and "monuments", but in categories of "meanings", "values", and "communications".

The philosophical significance of the obtained results lies in the transformation of the very logic of cultural temporality. Preservation ceases to be a form of resistance to change—it becomes a form of its conscious regulation. Culture, in the klironomical sense, is a living whole capable of sustaining itself through creativity, dialogue, and digital reproduction. Such understanding restores to the humanities their predictive function—the ability to comprehend the future not as a threat but as the continuation of memory.

The prospects for further research are associated with developing both theoretical and applied directions of klironomy. Among them are the creation of models of *klironomical dynamics* that study the regularities of self-development in cultural systems; the establishment of *digital platforms of cultural memory* integrating artificial intelligence, databases, and educational tools; and the elaboration of *international standards and indices of klironomical sustainability* that would assess the state of cultural ecosystems by their level of self-organisation and value coherence.

In the long-term perspective, klironomy may become the methodological core of a new humanitarian era—one in which technologies do not displace humanity but expand its capacity to comprehend and preserve the world of culture. This science can serve as a bridge between philosophy and digital engineering, between art and data, between memory and the future.

Thus, as a result of the conducted study, a holistic concept of the *philosophy of klironomy* has been formed—a metadiscipline explaining the evolution of cultural heritage in the age of artificial intelligence. Klironomy asserts a new paradigm of humanistic knowledge, in which preservation becomes an act of creation, and cultural heritage evolves into a living mechanism of the self-development of human civilisation.

Key findings of the study are:

1. Cultural heritage in the 21st century constitutes a self-organising system capable of reproducing its forms and meanings within digital civilisation. Unlike the traditional conservationist model, the klironomical approach reveals preservation as an internal process of cultural evolution ensuring continuity of existence.
2. The philosophy of klironomy forms a new ontology of culture—a *klironomical ontology*—in which cultural being is understood as an interaction between humans, society, and technology. The principles of continuity, multiplicity of being, self-organisation, and human–AI co-creation constitute its conceptual core.
3. The category of *self-organising cultural heritage* is introduced and theoretically substantiated, describing the mechanisms of resilience and adaptability in cultural systems.
4. Within the klironomical model, the human being ceases to be merely a custodian of the past and becomes a co-creator of cultural continuity, assuming ontological responsibility for values rather than form.
5. Artificial intelligence becomes a cognitive partner of the human in processes of preservation and interpretation, forming a phenomenon of cognitive synergy—the foundation of a new techno-humanitarian era.
6. Klironomy establishes itself as an interdisciplinary and metascientific system uniting philosophy, cultural studies, law, technology, and education into an integral framework.
7. The concept of *klironomical education and research* has been developed to train specialists of a new type—analysts of cultural memory and curators of digital heritage.
8. The philosophy of klironomy defines a new humanistic paradigm of the 21st century, in which cultural preservation becomes a creative act and heritage emerges as a living mechanism of civilisational evolution.

Conflict of Interest

The author declares no conflict of interest.

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The Hypothesis of the Unified Matrix of the Universe [9]

Abstract:
The study is devoted to the development and substantiation of the hypothesis of the Unified Matrix of the Universe, which postulates the existence of a universal morphogenetic principle governing the self-organisation of natural and cosmic systems. According to this hypothesis, the evolution of matter obeys a single "Matrix" code manifested in forms and processes at all levels of organisation — from molecular structures and biological organisms to geophysical and astrophysical systems. The relevance of the work is determined by the need to integrate scientific and philosophical models of self-organisation, which are currently studied in isolation. Contemporary theories — synergetics, fractal geometry, and reaction-diffusion models — demonstrate similar regularities of order emerging from chaos, yet they do not explain their universality. The Matrix hypothesis proposes a unified metatheoretical language for describing these processes, thus contributing to overcoming the fragmentation of modern scientific knowledge. The novelty of the study lies in the formulation of a universal morphogenetic principle uniting Turing's model, Mandelbrot's fractal concept, the mechanical theory of tensegrity, and the philosophy of biological relativity. For the first time, these approaches are considered as various manifestations of a single structural logic operating across all scales of being. The subject of the study comprises processes of self-organisation and morphogenesis in natural, biological, and cosmic systems, while the object consists of universal morphogenetic invariants: symmetry, self-similarity, and fractality. The study aims to substantiate the existence of a single morphogenetic law ensuring the recurrence of forms and the stability of the Universe's structure. To achieve this purpose, a complex of methods has been applied: systems and structural-functional analysis to identify hierarchies of self-organisation; modelling and a mathematical-symbolic approach to formalise universal regularities; the dialectical method to analyse the oppositions of symmetry and asymmetry; synergetic and fractal analysis to describe nonlinear processes of development; and hermeneutic and phenomenological approaches for the philosophical interpretation of the concepts of form and wholeness. The main content of the study covers three key areas. Firstly, Turing's model of morphogenesis is analysed, explaining the transition from homogeneity to structural order as a result of the interaction between an activator and an inhibitor. Secondly, the phenomenon of fractal self-organisation is revealed, demonstrating that the principles of self-similarity and scale invariance are universal across all levels of matter. Thirdly, a holistic interpretation of morphogenesis is presented, integrating the mechanical, geometrical, and bioelectrical aspects of form formation. Collectively, these results confirm the existence of underlying regularities linking the micro-, meso-, and macro-levels of matter into a single structural system. As a result, a universal morphogenetic scheme has been substantiated, in which the process of development is described as a transition from a symmetric "circle-seed" state to a multilevel structure of "leaf-like unfolding". The hypothesis has been confirmed through the analysis of reaction-diffusion, fractal, and mechanochemical models, as well as by interdisciplinary comparisons of biological, geophysical, and cosmological data. In conclusion, it is argued that the hypothesis of the Unified Matrix of the Universe forms a new paradigm of holistic morphogenesis, integrating the natural and human sciences. Its further development is associated with numerical modelling, morphometric and fractal analysis, and the philosophical integration of the concepts of symmetry, self-organisation, and form within the framework of a general metatheory of the morphology of being.

Keywords: morphogenesis, self-organisation, fractal geometry, holism, universal laws of nature, morphological matrix, theory of complex systems.

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Abbreviations:
SOFT is Self-Organising Fractal Theory,
UMU is Unified Matrix of the Universe.

Introduction

Contemporary science strives to overcome the fragmentation of knowledge about nature. Biology, physics, geology, and cosmology often describe processes of self-organisation in isolation, although all of them reveal similar regularities—the emergence of order from chaos, spontaneous symmetry breaking, and the formation of stable structures without external control. In this context, the hypothesis of the UMU becomes particularly relevant as an attempt to propose an integral model of morphogenesis that unites different levels of being within a single morphological law.

The relevance of this study is determined by the need for a universal language for describing the processes of structural formation. In the 21st century, synergetics, complex systems theory, and fractal geometry have demonstrated that nature employs recurring self-organisation patterns—from biomolecules to galaxies. Yet it remains unclear why these patterns are so universal and what connects the forms of life and the cosmos. The proposed hypothesis treats this question as a key to understanding the very logic of the universe's development.

The novelty and uniqueness of this work lie in the formulation of a metatheoretical principle—the Matrix—as a universal code of unfolding. The author integrates Turing's classical models (*1952*), Mandelbrot's fractal concept (*1982*), the mechanical theory of tensegrity (*Ingber, 2003a*), and the philosophy of biological relativity (*Noble, 2012*), demonstrating their structural kinship. Such a synthesis transcends disciplinary boundaries, forming a new paradigm of holistic morphogenesis.

The subject of the study is the processes of self-organisation and morphogenesis in natural and cosmic systems.

The object of the study is morphogenetic invariants—forms and regularities recurring at different levels of material organisation.

The purpose of the study is to develop and substantiate the hypothesis of the UMU as a universal principle of structure formation.

To achieve this aim, the following tasks were defined:

- analyse existing models of morphogenesis and self-organisation in the natural sciences;
- identify general morphological invariants (symmetry, self-similarity, fractality) in biological and cosmological systems;
- formulate the Matrix hypothesis as a universal law of morphogenetic unfolding;
- determine possible ways of experimental and computational verification of the hypothesis.

Thus, the research is aimed at finding a unified conceptual foundation explaining the recurrence of forms and regularities in the universe. It combines philosophical analysis with empirical and modelling methods, uniting natural and humanistic approaches to the study of the structure of being.

Methods

The methodological framework of the study of the UMU hypothesis is based on the combination of general scientific and specific philosophical methods, which ensures both conceptual depth and the possibility of interdisciplinary verification. Each method has a distinct functional purpose within the overall logic of the research—from theoretical analysis and modelling to philosophical interpretation of results.

The theoretical core of the study is the systems approach, which makes it possible to consider morphogenetic processes as the result of interactions among multiple interconnected levels—physical, biological, geophysical, and cosmological. This method was applied to justify the principle of hierarchical self-organisation discussed in the section "Formulation of the Hypothesis", where it is shown that each structural level reflects the previous one, albeit with greater topological complexity. The structural-functional analysis was employed to compare the functions and forms of systems of different natures—cellular networks, tectonic plates, galactic clusters—revealing a recurrent pattern of interaction between activator and inhibitor, analogous to Turing reactions (*Kondo & Miura, 2010*; *Turing, 1952*).

To formalise the hypothesis, modelling was applied—both in the traditional mathematical and the symbolic-philosophical sense. In the practical part of the research, reaction-diffusion models described by Turing and iterative fractal models by Mandelbrot (*1982*) were used. Their application made it possible to interpret the concept of the "seed-circle" as the initial symmetrical topology from which complex structure unfolds, thereby substantiating the universality of the morphogenetic mechanism. In the philosophical part, modelling served as a means of transition from empirical data to metaphysical categories—from physical form to the concept of the "Matrix".

The dialectical method was used to analyse the oppositions that permeate the process of morphogenesis: symmetry ↔ asymmetry, chaos ↔ order, unity ↔ multiplicity. This method made it possible to identify the internal dynamics of transitions, manifesting as the regular "unfolding" of structure from potentiality to actuality (see the section "Hypothesis and Its Formulation"). The principle of complementarity was employed to integrate physical-mathematical and philosophical interpretations, where the same process can be described both as an energetic interaction and as a meaningful form of being. Within the context of the Matrix hypothesis, this corresponds to the complementarity of materialistic and idealistic descriptions of the world.

The historical-comparative method was applied to trace the evolution of ideas of self-organisation—from ancient notions of harmony to modern synergetics and complexity theory. The research demonstrates that philosophical traditions (Plato, Leibniz, Goethe) anticipated many ideas of modern science, including symmetry, morphogenesis, and fractality. This method helped to reveal continuity between cultural-philosophical and scientific discourse, which is crucial for the integrative concept of the Matrix that bridges natural and humanistic domains of knowledge.

The study also relies on the concept of synergetics (*Nicolis & Prigogine, 1977*), describing mechanisms of self-organisation in nonequilibrium systems. In the philosophical part, this methodology was employed to interpret "transitional states"—phase changes, bifurcations, and symmetry breaking. Nonlinear dynamic analysis demonstrated that morphogenesis is not a

linear process of growth but the result of the competition between interacting parameters. This approach is particularly significant in the context of the section "Verification Methods", where experimental models of reaction-diffusion systems are proposed to confirm the fractal dynamics of self-organisation.

Fractal analysis was used to describe self-similar structures mentioned in the sections "Fractal Self-Organisation" and "Possible Verification Methods". Box-counting and spectral analysis techniques were applied to characterise the scale invariance of systems. The theoretical interpretation is based on the works of Mandelbrot (*1982*) and Kurakin (*2011*), as well as more recent studies (*Ivanov & Bartsch, 2024*). This method revealed universal regularities in the distribution of forms—from biological tissues to galactic systems—and thus provided empirical support for the hypothesis of morphogenetic universalism.

Phenomenological analysis was applied in the philosophical part of the study to identify semantic structures underlying physical models. Through this method, the significance of "form" as a phenomenon uniting matter and meaning is revealed. Hermeneutics was employed to interpret the archetypes of the "circle" and the "leaf" as symbols of universal unfolding of being. These methods ensured the philosophical coherence of the hypothesis, allowing it to be interpreted not only as a model of the world but also as a concept of the genesis of meaning within structure.

A special role was played by the method of interdisciplinary reconstruction, applied to integrate results from various fields—physics, biology, geology, architecture, and cognitive sciences. This method demonstrated that morphogenetic regularities are not confined to biology but are present in the most diverse forms of material organisation. In particular, structural analogies between architectural proportions and biomechanical tensegrity structures (*Ingber, 2003b*) were used to substantiate the idea of structural universality.

At the final stage, a metaphilosophical method was applied, integrating the results of analysis into a unified morphogenetic metatheory. The method of analogy was used to compare physical, biological, and cultural forms. Thus, the methodology of studying the Matrix is not confined to a single direction; it represents a complex that unites empirical, theoretical, and hermeneutic strategies.

As a result, the use of these methods made it possible not only to develop a philosophical-scientific hypothesis but also to ensure its verifiability and logical coherence.

Literature Review

The theoretical and methodological foundation of the study rests upon a broad interdisciplinary corpus encompassing natural, mathematical, and philosophical sciences. The reviewed literature is structured into thematic blocks that reflect the logical progression of the hypothesis formulation.

The foundation of the hypothesis lies in the seminal work of Turing (*1952*), who first proposed the reaction–diffusion model of spatial structure formation. This theory served as a starting point for the formulation of the activator–inhibitor principle, which in the present study is interpreted as a universal mechanism of the Matrix. Its development in biological systems is demonstrated in the works of Kondo and Miura (*2010*) and Scholes and Isalan (*2014*), which

experimentally confirmed the applicability of Turing's model to pigmentation and cellular segmentation.

The work of Nicolis and Prigogine (*1977*) became the cornerstone for understanding self-organisation in non-equilibrium systems. The ideas of dissipative structures and fluctuation dynamics were applied in the Discussion section to describe transitions from symmetry to structural order. These principles formed the basis for analysing morphogenetic phases and energy flows.

The classical monograph by Mandelbrot (*1982*) established the mathematical language of self-similarity. Its propositions were further developed by Kurakin (*2011*) and Gisiger (*2001*), confirming that fractal structures are universal for both living and non-living matter. In physiological contexts, this direction was extended by Goldberger et al. (*2002*) and West (*2013*), whose works were used to describe biological fluctuations and the scale-invariant stability of physiological processes.

The studies by Ingber (*2003a*; *2003b*) on the tensegrity principle provided philosophical and biological grounding for interpreting the integrity of morphogenesis, where mechanical tension and compression act as the primary regulators of form. These works are directly related to the section Holistic Approaches. The concept of Noble (*2012*) expands this framework by introducing the principle of biological relativity—the equality of all levels of causation.

The monograph by Longo and Montevil (*2014*) develops a philosophical interpretation of symmetry and time, introducing the notion of biological singularity. These ideas are employed in the study for analysing the concepts of unfolding and symmetry breaking. In turn, Jaeger and DiFrisco (*2019*) criticise reductionist networks and propose a processual understanding of the evolution of forms—an approach closely aligned with the Matrix hypothesis as a processual metatheory.

Research by Levin (*2014*) demonstrates that the distribution of bioelectrical potentials functions as a spatial code of morphogenesis, supporting the idea of the existence of energetic field matrices. These findings were used to substantiate the energetic dimension of the hypothesis.

The works of Turcotte (*1997*) and Pietronero (*1987*) show that fractal and self-organised structures are present in geology and cosmology. These data were employed in the Methods of Verification section to argue for the large-scale universality of the morphogenetic law.

The studies by Werner (*2010*), Ivanov and Bartsch (*2024*) confirm that brain activity and physiological processes follow fractal regularities. This allows the Matrix to be interpreted not only as a physical but also as a cognitive structure, integrating the levels of nature and consciousness.

Thus, the literature review reveals the logical continuity of ideas from classical models to contemporary metatheories. All sources serve not merely as a background but constitute a coherent theoretical framework within which the hypothesis of the Unified Matrix of the Universe emerges as a natural continuation of the evolution of scientific thought—from the analysis of particular systems to the search for a universal law of self-organisation.

Results

Theoretical Overview

Morphogenesis and the Turing Model

The question of how spatial structures can spontaneously emerge from a homogeneous medium occupies a central place in the study of morphogenetic processes in both biological and cosmological systems. One of the earliest theoretical models to propose a universal mechanism of self-organisation was Alan Turing's reaction–diffusion model, presented in his seminal work The Chemical Basis of Morphogenesis (*Turing, 1952*). In this study, the author demonstrated that the interaction of two chemical substances—an activator and an inhibitor—with differing diffusion rates may lead to the formation of stable spatial patterns from an initially uniform state of the medium. This discovery became fundamental for the subsequent development of theoretical biology, mathematical morphology, and synergetics, as it revealed that order and complexity may arise without external control, purely through internal dynamic interactions.

The core principle of the Turing model lies in the fact that local positive feedback (self-amplification of the activator) combined with long-range inhibition creates the conditions for diffusion-driven instability. Such a mechanism leads to the spontaneous breakdown of equilibrium and the emergence of ordered spatial structures, including stripes, spots, spirals, and other types of patterns (*Murray, 2003*). Later experimental research confirmed the applicability of the reaction–diffusion model to a wide range of biological systems—from pigment distribution on animal skin to embryo segmentation and tissue growth (*Kondo & Miura, 2010*). In these studies, the Turing model is regarded not merely as an abstract construct but as a universal mathematical language describing the dynamics of self-organising systems.

Studies in synthetic biology (*Scholes & Isalan, 2014*) demonstrated that the principles embedded in the Turing model can be artificially reproduced, thus confirming its fundamental robustness as a conceptual framework. Researchers succeeded in programming cellular populations that replicate Turing-type patterns, thereby showing that self-organisation can be not only a natural but also a controllable process. In turn, the analysis of reaction–diffusion systems by Landge et al. (*2019*) helped clarify the mechanisms of their stability and transitions to more complex dynamic regimes, thereby bringing theoretical formulations closer to actual biological observations.

Further development of the model has involved refining its parameters and exploring boundary conditions influencing pattern stability. Marciniak-Czochra, Karch and Suzuki (*2013*) demonstrated that even minor changes in the ratios of reaction and diffusion rates may lead to the breakdown of stable structures or to a transition of the system into a chaotic state. These results confirmed the sensitivity of the Turing mechanism to initial conditions and environmental parameters, making it particularly significant from the standpoint of the philosophy of self-organisation and the theory of complex systems. Similarly, in hybrid discrete–continuous models developed by Macfarlane, Chaplain and Lorenzi (*2020*), reaction–diffusion equations were combined with cellular automata, allowing for more precise descriptions of tissue morphogenesis where chemical and cellular processes interact.

Particular importance is attached to works that expand Turing's ideas within the context of biological self-organisation and nonlinear dynamics. Meinhardt (*2012*) emphasised that the key mechanisms for forming stable structures are local self-enhancement and long-range inhibition, which are universal and manifest across multiple scales—from the molecular to the macroscopic. Forsström (*2022*), in his analytical review, demonstrated that the Turing model remains relevant in the twenty-first century, serving not only as a biological but also as a philosophical instrument for describing the transition from chaos to order.

Thus, the concept of morphogenesis based on reaction–diffusion mechanisms demonstrates how complex, ordered organisation may emerge from the simple interactions of elementary units—whether molecules, cells, or other structural agents. Within the framework of the Hypothesis of the Unified Matrix of the Universe, this process acquires a metaphysical dimension: if matter is conceived as a universal medium governed by the principles of activation, inhibition, and diffusion, then the diversity of forms of being—from the physical to the mental—may be understood as the manifestation of a single morphogenetic law. The Turing model, therefore, appears not merely as a specific instance of biological self-organisation but as a philosophical-mathematical representation of the universal mechanism of structural evolution in the Universe, where complexity arises from homogeneity and individuality from symmetry (*Kondo & Miura, 2010*; *Meinhardt, 2012*; *Scholes & Isalan, 2014*; *Turing, 1952*).

Fractal Self-Organisation

Fractal geometry, first systematically elaborated by Benoît Mandelbrot, became a key paradigm for understanding that the complexity of natural forms can emerge through simple, scale-invariant laws. In The Fractal Geometry of Nature (*Mandelbrot, 1982*), it was demonstrated that many natural configurations—from coastlines and tree crowns to pulmonary structures—exhibit self-similarity, whereby a structure observed at one scale is repeated at others. Mandelbrot thus introduced a mathematical language capable of describing natural complexity without the need to postulate an external designer or pre-given form.

The development of this idea within the context of biological and systems sciences led to the hypothesis that both living and non-living systems—across all levels of organisation—may generate fractal, self-similar structures through processes of self-organisation. Kurakin (*2011*) proposed the SOFT, according to which matter and energy exist in a continuous flux and non-equilibrium state, giving rise to multiscale self-similar structures. This concept posits that the laws of self-organisation act universally—from molecular interactions and cellular networks to ecosystems and cosmic structures—while fractality represents the natural expression of the fundamental dynamics of matter.

Empirical studies confirm that fractal structures are widespread in living systems. For instance, anatomical formations such as vascular networks, the bronchial tree of the lungs, and cerebral convolutions display clear fractal geometry, which ensures the optimisation of functional processes such as oxygen transport, signal transmission, and nutrient distribution (*Gisiger, 2001*; *West, 2013*). Fractal networks are characterised by high resilience, efficient distribution, and the capacity to maintain systemic integrity under local perturbations (*Goldberger et al., 2002*).

In neurophysiology, Werner (*2010*) demonstrated that the human nervous system exhibits fractal properties at all levels—from dendritic branching to the organisation of neural networks. This self-similar structure supports flexibility, adaptability, and the self-organisation of cognitive processes. Similar regularities are observed in metabolic and mitochondrial networks, where percolation and criticality processes generate stable functional clusters possessing fractal topology (*Aon et al., 2004*).

Research in complex network theory shows that fractal self-organisation is closely associated with the phenomenon of self-organised criticality, proposed by Bak, Tang and Wiesenfeld (*1987*). According to this theory, complex systems operating near a critical state spontaneously form scale-invariant structures and display power-law distributions. Such regularities have been recorded in neural, ecological, and social networks, where small local perturbations can trigger large-scale reorganisations—a dynamic reflecting the essence of nonlinear self-organisation (*Sporns, 2006*).

In physiology and medicine, analogous processes of fractal self-organisation are observed in temporal series—such as the dynamics of cardiac rhythms and respiration. Studies have shown that these processes exhibit multifractal characteristics and demonstrate synchronisation of complexity among physiological systems (*Ivanov & Bartsch, 2024*). Such interaction of fractal rhythms across different physiological domains is interpreted as a manifestation of coordination and self-regulation within the organism as an integrated whole.

Thus, fractal geometry (*Mandelbrot, 1982*) and subsequent research (*Bak et al., 1987*; *Kurakin, 2011*; *Werner, 2010*) reveal that self-similarity and scale invariance occur across all levels of organisation—from cellular networks to galactic structures. This supports the idea that unfolding in the form of a multilayered, self-similar sheet represents a universal scheme of organisation and an expression of the fundamental law of self-development of matter. Consequently, fractal self-organisation demonstrates that the principles of self-similarity and scale invariance are not merely mathematical abstractions but universal laws governing the formation of structure in nature. Within the context of the Hypothesis of the UMU, fractality appears as a manifestation of matter's intrinsic capacity for self-organisation, wherein each local state reflects the global structure. The Universe may thus be viewed as a fractal system in which order and complexity arise not from external imposition but as the outcome of internal, self-similar processes of self-development (*Goldberger et al., 2002*; *Ivanov & Bartsch, 2024*; *Kurakin, 2011*; *Mandelbrot, 1982*; *Werner, 2010*).

Holistic Approaches

The holistic perspective in morphogenesis proceeds from the assumption that tissue forms and functions arise through the coordinated dynamics of multiple levels—from molecular regulation to tissue mechanics and geometry—without privileging a single causal level. This approach seeks to integrate physical fields, biomechanics, geometric constraints, and molecular-genetic processes into a unified explanatory framework (*Noble, 2012*; *Werner, 2024*). Within this framework, causal influences circulate both bottom-up (from molecules to tissues) and top-down (from boundary conditions and tissue geometry to genetic expression), constituting what Noble (*2012*) terms the "biological relativity" of levels.

The key contribution of holism lies in demonstrating that the "material" and "informational" aspects of morphogenesis are inseparable: physical fields and mechanical stresses are not merely accompanying phenomena but active regulators that shape stable developmental trajectories (canalisation). Thus, the tensegrity architecture of cells and tissues explains how the global mechanics of the cytoskeleton and extracellular matrix modulate local biochemical signals and cell fates (*Ingber, 2003a*; *Ingber, 2003b*). At the same time, it has been shown that physical constraints and the flow of energy and matter can canalise morphogenesis, rendering form generation robust to variation and noise (*Dassow & Davidson, 2011*).

Placed within an evolutionary perspective, the concept of "dynamic pattern modules" (DPM) interprets morphogenesis as the outcome of interactions between "biogenerative" physical processes (adhesion, wetting, viscoelasticity, reaction–diffusion instabilities) and the molecular "instruments" of development. DPMs serve as a "pattern language" capable of generating repertoires of forms and organisms, while genes act as switches and stabilisers of already available physico-geometric regimes (*Benítez et al., 2018*; *Newman & Bhat, 2008*; *Newman, 2019*). This synthesis, which extends beyond classical gene-centrism, reveals that many morphogenetic invariants are prefigured by the universal physical properties of living matter.

Another layer of holistic integration concerns bioelectrical fields, which form "non-genetic" maps of integrity and repair. Endogenous transmembrane potentials and tissue-level currents encode spatial information about the target morphology and guide regeneration and development in concert with biomechanics and chemical gradients (*Levin, 2014*). This demonstrates that morphogenesis depends on distributed control fields in which electrophysiology, mechanics, and chemistry mutually constrain and direct one another.

Philosophical and methodological developments in holism emphasise that biological entities cannot be reduced to stationary sets of components: time, symmetries, and singularities organise the space of developmental possibilities. Such an "organismic" perspective proposes to view forms as the result of historical symmetry breakings and shifts in dynamical regimes, rather than as genome-determined templates (*Longo & Montevil, 2014*). Accordingly, explanation must combine geometry, boundary conditions, energy flows, and regulatory networks within a single model of process (*Jaeger & DiFrisco, 2019*).

Taken together, holistic approaches demonstrate that identical motifs—mechanical tensions, geometric constraints, reaction–diffusion and bioelectrical fields—operate in coordination across scales. This explains the persistence of morphological invariants and recurrent developmental "channels", as well as the variability emerging at transitions (bifurcations) in complex tissue media (*Dassow & Davidson, 2011*; *Newman, 2019*). Such a view aligns with the evolutionary dynamics of form repertoires, where selection acts upon already accessible physico-geometric templates stabilised by genetic mechanisms.

Thus, within the framework of the "Unified Matrix Hypothesis of the Universe", the holistic vision of morphogenesis interprets the emergence of form as the expression of universal laws of material organisation, in which physical fields, geometry, and multiscale regulation are coupled into a single morphogenetic matrix. Universal mechanisms—tensegrity, DPMs, bioelectrical and reaction–diffusion fields—function as coordinated modalities of one and the same structuring substrate, from which stability, variability, and morphological diversity arise

through both top-down and bottom-up interactions (*Ingber, 2003a*; *Ingber, 2003b*; *Levin, 2014*; *Longo & Montevil, 2014*; *Newman & Bhat, 2008*; *Noble, 2012*; *Werner, 2024*).

Formulation of the Hypothesis

1. Initial Structure

Any system—from the molecular to the cosmological level—begins its development from a state that can be described as a "circle-seed": a closed, symmetrical, and potentially saturated structure containing the code for its further unfolding. In this context, the circle is not a geometric abstraction but a universal topological form in which each point is equivalent to every other, so the system exists in a state of pre-maximal symmetry. This configuration corresponds to minimal entropy of form and maximal potential for subsequent symmetry breaking—acts of morphogenetic unfolding. Analogous states are described in biological and cosmological models as the phase of "initial simplicity", from which structural complexity emerges (*Nicolis & Prigogine, 1977*). The circle-seed can thus be viewed as an archetype of "potential form", in which the code of the future is embedded not in specific matter but in the geometric and dynamic relations among the elements of the field.

2. The Unfolding Process

Development proceeds according to the principle of a "multilayered and multifaceted sheet"—a form that not only grows quantitatively but also qualitatively complicates its own structure through the addition of levels, facets, and planes. Each new "layering" reflects a phase of energetic or informational transformation, analogous to how a biological embryo passes through stages of morphogenesis or a crystal through phases of symmetry growth. This process may be interpreted as a transition from the potential to the actual: the folded form unfolds, generating increasingly complex interconnections and stable structures. In physico-biological models, such dynamics are described as a transition of the system from a homogeneous state to self-organised patterns (*Kondo & Miura, 2010*; *Turing, 1952*). Within the framework of the Matrix Hypothesis, this unfolding expresses the universal law of the evolution of form—the gradual "blossoming" of the encoded seed into a multilayered wholeness.

3. Scalarity and Self-Similarity

The unfolding process follows the principle of fractal self-similarity, whereby each new phase reproduces the structural principles of the preceding one, yet at a different scale. This property helps to explain the recurrence of morphogenetic motifs across diverse domains—from vascular branching to spiral galaxies. As demonstrated in the works of Mandelbrot (*1982*) and Kurakin (*2011*), fractal regularities are not random but express fundamental principles of material organisation. A system endowed with an internal algorithm of self-similarity retains stability across scales, reflecting its scalar nature. Philosophically, this implies that the laws governing the formation of form are invariant across levels of being: what occurs within a cell is analogous to what unfolds within the universe. Self-similarity thus enables the translation of knowledge across disciplines—from biology and geophysics to architecture and cultural studies.

4. Integration of Levels

Morphogenetic regularities manifest simultaneously on the micro-, meso-, and macro-levels, forming a continuous system of correlations (molecules → cells → organisms → planets → galaxies). On the micro-level, this is observed in the behaviour of protein and cellular structures, where reactions, diffusion, and biomechanics generate growth patterns (*Meinhardt, 2012*). On the meso-level, tissue and organ organisation embody the principle of tensegrity, ensuring structural integrity (*Ingber, 2003a*). On the macro-level, analogous stress fields and energy flows within geophysical and cosmological processes give rise to planetary and galactic structures (*Werner, 2024*). These levels are not autonomous: each subsequent scale reflects the preceding one, but within a more complex topology. In this sense, morphogenesis becomes a universal language linking the material, energetic, and informational strata of reality. The integration of levels indicates that the "Matrix" is not an abstract metaphysical principle but a genuine law of systemic organisation operating across the full spectrum of scales.

5. Transconceptual Unity

The UMU postulates the existence of a universal morphogenetic code connecting biological, geophysical, cosmic, architectural, and cultural forms. This code manifests as a structural invariant—the circular seed and the unfolded sheet—reiterated across domains of being through analogous patterns of symmetry, fractality, and self-organisation. Biology demonstrates this principle through morphogenetic fields, architecture through recursive proportions and harmonic forms, and culture through symbolic structures grounded in cycles and unfoldings. Such unity may be regarded as a transdisciplinary expression of a universal law of morphogenesis, wherein diverse forms of knowledge—natural and humanistic—converge within a single paradigm (*Longo & Montevil, 2014*; *Werner, 2024*). Consequently, the Matrix Hypothesis offers not only an explanatory model of nature but also a philosophical platform for the integration of scientific disciplines, linking the ontology of form with the epistemology of knowledge.

Thus, the Hypothesis of the UMU asserts that the evolution of form is a universal process of transition from the symmetrical state of the "circle-seed" to a multilevel, self-similar, and integrated structure. This process manifests in all domains—from biomolecular complexes to cosmic systems—affirming the existence of a common morphogenetic law governing the unfolding of matter.

Possible Methods of Verification

1. Numerical Models

Testing the UMU hypothesis requires computational approaches capable of reproducing universal patterns of self-organisation across different scales. The principal methodological tool here is numerical modelling based on reaction–diffusion dynamics, mechanochemical systems, and fractal iterative algorithms. Contemporary versions of the Turing equations and models derived from L-systems (*Lindenmayer, 1968*) make it possible to simulate the growth of biological tissues, crystals, and geophysical structures with a high degree of morphological similarity to natural objects. These models enable not only visualisation of the morphogenetic process but

also exploration of parameters under which the system spontaneously shifts from homogeneity to a self-organised structure (*Maini et al., 2012*; *Mercker et al., 2013*).

Fractal and multifractal models employed in nonlinear dynamics and the physics of complex systems provide the theoretical foundation for studying scale invariance and self-similarity. Through fractal analysis (*Mandelbrot, 1982*) and inverse diffusion algorithms, it becomes possible to formalise the transition from the "seed-circle" to a multi-level "leaf" as an iterative process governed by nonlinear growth equations. Comparing computational models with empirical data from biology, geophysics, and cosmology allows the identification of universal parameters of self-organisation—the range of fractal dimensionality, the rate of symmetry breaking, and the critical points of phase transitions. Thus, numerical simulations establish a quantitative basis for testing the morphogenetic universality of the Matrix hypothesis.

2. Morphometric Analysis

Morphometric methods provide the means to empirically verify the geometric and statistical invariants predicted by the hypothesis. Analysis of fractal dimensionality (D) and symmetry indices in natural and artificial structures makes it possible to detect the presence of self-similar patterns at multiple scales—from the microstructures of living tissues to tectonic landforms. Fractal-geometry techniques based on box-counting, spectral analysis, and wavelet decomposition can be employed to measure morphological complexity and to compare biological, geophysical, and astrophysical objects (*Gisiger, 2001*; *West, 2013*).

Additionally, geometric morphometrics (*Bookstein, 1997*), which involves shape analysis via landmark coordinates and principal-component methods, can be applied to quantify the transition from symmetric to asymmetric configurations—a direct indicator of morphogenetic unfolding. By comparing data from various domains (for instance, plant-leaf growth, crystallisation dynamics, and planetary-crater distribution), it becomes possible to statistically identify universal regularities described by the "circle-to-leaf" model. Hence, the morphometric approach provides a bridge between visual phenomenology and rigorous geometric verification of the hypothesis.

3. Reaction–Diffusion Experiments

Empirical validation of the hypothesis at the level of physical and biological systems may be achieved by reproducing Turing patterns under laboratory conditions. Modern reaction–diffusion experiments demonstrate that mechanochemical and bioelectric processes can form stable morphological patterns analogous to those observed in living nature (*Kondo & Miura, 2010*; *Mercker et al., 2013*). Systems based on active gels, colloids, membranes, and synthetic cellular media (synthetic morphogenesis) allow the observation of "leaf-like" structures formed under variations in diffusion coefficients, viscosity, and energy flux.

Beyond chemical models, experiments in bioelectric shape regulation (*Levin, 2014*)—where membrane-potential distributions determine tissue-growth trajectories—are of significant importance. Observing analogous regularities across chemical, biological, and mechanical media would confirm the universality of the morphogenetic-unfolding law implied by the Matrix hypothesis. These experiments also open prospects for interdisciplinary synthesis: modelling

activation–inhibition dynamics through plasma or photonic systems may reveal that principles of self-organisation manifest both in matter and in energy flows.

4. Geophysical and Cosmological Analysis

The final level of verification involves applying the hypothesis to large-scale natural structures. Geophysical data, including digital elevation models, tectonic-field maps, and the distribution of mountain systems and river networks, can be subjected to fractal analysis to uncover self-organisation patterns of the Earth's surface (*Turcotte, 1997*). Like biological tissues, the lithosphere exhibits hierarchical structures emerging from the interaction of activating and inhibiting processes such as tectonic stress, erosion, and volcanism. Studying correlations between parameters of terrestrial dynamics and continental morphology enables evaluation of the applicability of the morphogenetic-universality principle at the geological level.

In cosmological models, similar methods may be used to analyse the distribution of galactic clusters and dark matter, where the fractal organisation of mass–energy is observed (*Pietronero, 1987*). Identifying coinciding parameters of fractal dimensionality ($D \approx 2–2.3$) in the structures of the biosphere and the metagalaxy would serve as evidence for the existence of a unified morphogenetic principle operating from micro- to mega-scales. In the future, data from astronomical missions (Gaia, JWST) and geophysical satellites may be employed to construct integral maps of the Universe's self-organised structures as empirical confirmation of the UMU hypothesis.

Discussion

The developed hypothesis of the UMU raises fundamental questions about the nature of morphogenesis and the universality of self-organisation laws. It aspires to integrate several scientific paradigms—Turing's reaction–diffusion models, Mandelbrot's fractal geometry, biomechanical concepts of tensegrity, and holistic biological relativity (*Ingber, 2003a*; *Mandelbrot, 1982*; *Noble, 2012*; *Turing, 1952*). However, such a synthetic approach generates a number of methodological and philosophical challenges.

The first issue concerns the boundary between metaphor and strict formalisation. The transfer of the notions of "circle-seed" and "leaf-unfolding" from the symbolic-philosophical to the physico-mathematical sphere requires the development of formalised equations linking shape geometry, energy dynamics, and temporal parameters of development. Existing models—from Turing equations to fractal iterations—describe particular levels of self-organisation but fail to capture transitions between them. The challenge lies in constructing a multilevel mathematical model in which morphogenesis is interpreted as a process of symmetry translation across scales—from molecule to galaxy.

The second issue is the gap between empirical and philosophical interpretation. In biology and physics, self-similarity and reaction–diffusion processes are experimentally confirmed, yet their extrapolation to cosmological and cultural levels remains hypothetical. This necessitates a reconsideration of epistemological criteria: how can observational data be correlated with universal laws? A possible solution lies in applying the concept of "biological relativity" (*Noble, 2012*), where causation is understood as multidirectional—both upward and downward through the hierarchy of levels.

The third difficulty concerns the role of randomness and directionality. If morphogenesis is universal, how is the individuality of forms preserved within this universality? Should fluctuations and bifurcations be regarded as manifestations of freedom within a deterministic matrix, or as stochastic perturbations within an ordered field? An answer may be found through the statistical mechanics of nonequilibrium systems (*Nicolis & Prigogine, 1977*), where randomness acts as a necessary component of structural transition.

The fourth issue concerns the limits of reductionism. A universal approach risks levelling the specificity of local mechanisms unless the contextuality of each level—biological, geophysical, cultural—is considered. To prevent this, a strategy of "transdisciplinary concretisation" is required: the identification of invariants while preserving the uniqueness of each scale. This opens the space for a philosophical dialogue between the natural and human sciences, which is particularly relevant for emerging interdisciplinary domains such as psychophysiological aesthetics and cognitive cosmology.

Finally, the question of experimental verifiability remains. The proposed methods—modelling, morphometric and fractal analysis, reaction–diffusion experiments—provide a path to partial verification but demand a unified database and parameter system. Contemporary digital technologies—artificial intelligence, big-data modelling, and multiscale process simulations—may serve as instruments for the quantitative testing of morphogenetic hypotheses.

As promising directions for further discussion, the author proposes the following questions to the scientific community:

- Can a single morphogenetic equation be derived that integrates reaction–diffusion and fractal mechanisms?
- What is the role of bioelectrical and quantum-field effects in maintaining morphological stability?
- Is it possible to transfer the principles of morphogenesis to the level of cultural and cognitive systems without losing scientific verifiability?
- What are the limits of applicability of the Matrix hypothesis—is it an ontological law or an epistemological metaphorical framework?

Thus, the discussion around the hypothesis extends beyond abstract philosophy: it sets the coordinates for future integration of natural-scientific and humanistic paradigms.

Conclusion

The conducted research has made it possible to substantiate the hypothesis of the UMU as a universal principle of morphogenesis operating across all domains of existence—from the microscopic to the cosmological. The Matrix manifests itself in two archetypal models—the "circle-seed" and the "leaf-like unfolding"—which reflect the transition from symmetry to multilevel differentiation.

The analysis of Turing models, fractal self-organisation, and holistic biomechanical theories has shown that all of them exhibit a common pattern—the transition from homogeneity to structural complexity. This confirms the idea of a shared mechanism of matter self-organisation

capable of manifesting through diverse physical carriers—chemical, biological, mechanical, or energetic.

The present work has refined the concept of morphogenetic universalism: self-organisation is considered not as a random coincidence of regularities but as an expression of a unified morphological logic of being. The results demonstrate that physical fields, biomechanical tensions, bioelectrical potentials, and geometric constraints form coherent layers of one and the same structural matrix.

Thus, the objectives set out in the Introduction have been achieved. A universal morphogenetic scheme describing the transition from a potential state—symmetry—to an actualised form has been identified. The hypothesis has received partial confirmation in empirical and theoretical models, yet it requires further quantitative verification.

The future development of the hypothesis implies the creation of an interdisciplinary platform where physics, biology, philosophy, and digital modelling interact within a shared conceptual language. The proposed Matrix may become the foundation of a new science of forms—a morphological metatheory uniting the natural and the human sciences.

Conflict of Interest

The author declares that there is no conflict of interest.

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Appendix

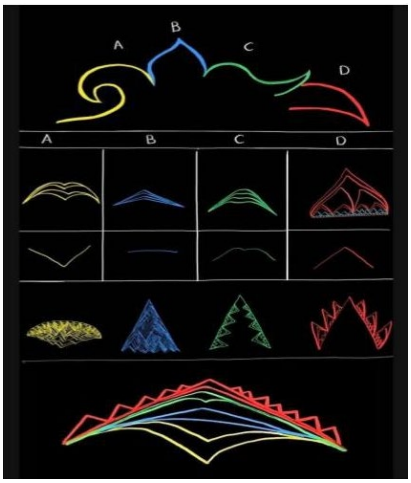

Figure 1 Matrix image

Figure 2. Matrix mapping in rocks

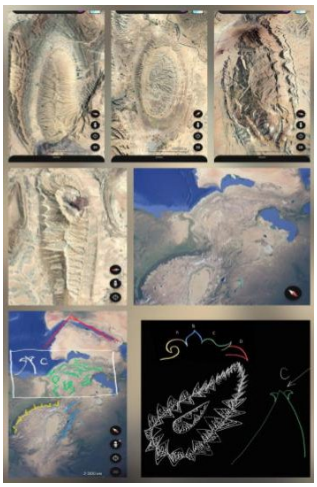

Figure 3. Associative images of craters on Earth and the Moon ("C")

Figure 4. Matrix of crop circles

Figure 5. Galaxy, tree and flower—associative unity

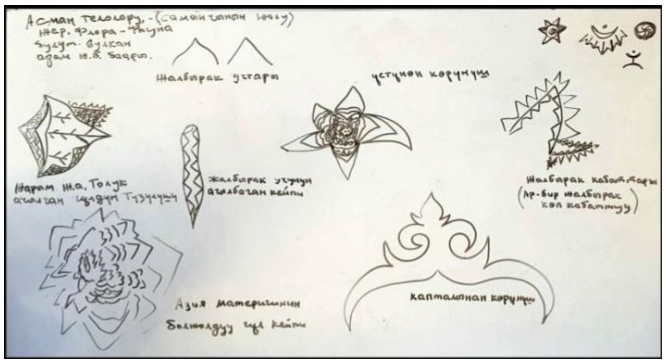

Figure 6. The fractal image of the matrix

Olga N. Dyachenko [a][11]

The Natural World as an Explication of Ethical and Axiological Meanings in Greco-Eastern Patristics [10]

Abstract:
In the context of historical and philosophical reflection, the question of the status of the natural world and humanity's relationship to it has always remained one of the key issues — especially today, when alarming forecasts of global natural cataclysms increasingly warn of potentially catastrophic consequences on a universal scale. The novelty of this research lies in its historical and philosophical analysis of the ethical and axiological interpretation of nature in the Early Middle Ages. The subject of the study is the natural world as an explication of ontological and ethical–axiological meanings in the works of representatives of Greek–Eastern patristics. The object of the study is the origin and meaning of the natural world within the hierarchy of being in patristic philosophy. The study aims to conduct a historical and philosophical analysis of the ontological foundations in the interpretation of nature and the animal world within the context of medieval mental culture. The article presents constitutive positions characterising conceptions of the natural world in Greek–Eastern patristics. It explores the reasons for its creation and interpretations of nature as testimony to God's will, reflected in the writings of Christian thinkers of the 4th–6th centuries, as well as the significance of the created world in human spiritual experience and as a source of ethical–axiological meanings. The author concludes that the created world as a whole and its individual components, within the theocentric horizon of thought, are central to medieval ontology and reveal the fundamental ethical and axiological principles formed within the mental culture of the Early Middle Ages. A fundamental idea in Greek–Eastern patristics is the transformation of human nature, corrupted by sin, which is to be aided by understanding the meanings established by God in the laws of the universe, including the existence of the animal world. This approach excludes a consumerist attitude towards nature and the utilitarian interpretation of science and scientific knowledge prevalent in the modern era.

Keywords: natural world, nature, created world, Greek–Eastern patristics.

Introduction

Modern humans have become so accustomed to perceiving the natural world from utilitarian and pragmatic perspectives that it is no longer possible to discern other causes and meanings inherent in nature. Such an attitude does not always correlate with the multitude of threats depriving humankind of prospects for continued existence and a positive future.

The question of the origins of the natural world remains within the scope of interest and inquiry across numerous branches of science. However, the issue of ethical and axiological motives in interpreting the meanings and purposes of nature within contemporary conceptual frameworks is relatively rare.

In the context of medieval worldviews, it was impossible to think about the natural (created) world in terms of "benefit", "usefulness", or "utilisation". Consequently, the relationship between humans and nature was built upon an entirely different constitutive principle—the task of transforming human nature within earthly existence and defining practical approaches to its perfection after its corruption through the Fall. In this respect, it is necessary

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to explore how, within the framework of medieval theocentrism, the question of the meaning and origin of nature, as well as the causes for the emergence of plants and animals, was interpreted.

The novelty of this research lies in presenting a historical and philosophical analysis of the ethical and axiological approach to the interpretation of nature in the early Middle Ages.

The subject of the study is the natural world as an explication of ontological and ethical-axiological meanings in the works of the representatives of Greek-Eastern patristics.

The object of the study is the origin and meaning of the natural world within the hierarchy of being in patristic philosophy.

The study aims to provide a historical and philosophical analysis of the ontological foundations of interpretations of nature and the animal world in the context of medieval mental culture.

The research objectives are as follows:

- Elucidate the constitutive principles concerning conceptions of the natural world and the causes of its creation in Greek-Eastern patristics;
- Examine the understanding of nature as a source of divine knowledge and as a form of testimony to God's will;
- Identify the significance of the created world in human spiritual experience and its role as a source of ethical and axiological meanings in the interpretations of Greek-Eastern patristic thinkers.

Methods

The theoretical foundation of this study—determined by its conceptual scope and the problematic nature of questions concerning the status of the natural world in early medieval philosophy—comprises several primary sources. These include, first and foremost, selected texts from the Old and New Testaments, which form the fundamental basis of medieval mental culture, as well as the writings of representatives of Greek-Eastern patristics, mainly from the fourth and fifth centuries, in which the status of the created world and its historical-philosophical issues were constituted.

In addition, the research draws upon studies by foreign and Russian scholars that address various issues related to global ecological problems, the negative prospects of future development shaped by present threats, and the forecasting of potential natural catastrophes and their causes.

The principal methodological principles underlying the study are historicism, objectivity, induction, and synthesis.

The methodological framework is grounded in a comprehensive approach, determined by the interdisciplinary nature of the research.

The historical-philosophical method was employed to analyse the main stages in the formation of the conceptual foundations of medieval thought. The methods of problematization and historical-philosophical reconstruction made it possible to explicate the problematic horizon within which the idea of nature as a source of divine knowledge was constituted, in line with medieval theocentrism.

The examination of various approaches and symbolic interpretations of the origin of the animal world, as presented in the works of Christian thinkers of the fourth and fifth centuries, required the application of the dialectical method. This method also made it possible to establish the internal relationship between ontological and ethical-axiological understandings within the intellectual tradition of the medieval period.

When comparing interpretations of mercy toward creation as a moral duty of the Christian and a specific form of virtue, as well as its role in spiritual experience and in transforming the sinful human nature—represented in the writings of the Syrian ascetic and theologian Isaac of Nineveh and Francis of Assisi—the study employed comparative analysis. This made it possible to identify commonalities in their approaches, despite belonging to different intellectual traditions: Eastern Orthodox and Roman-Latin.

The use of contextual analysis enabled the conceptualisation of the notion of nature as a form of testimony to God's will and as a mode of His address to humankind—an idea that is central to Greek-Eastern Christian philosophy. In examining dogmatic-polemical and exegetical works of Christian authors from the fourth to sixth centuries, the hermeneutical method was also applied.

Literature Review

At present, many thematic lines in the examination of the relationship between humans and nature are explored through the prism of ecological problems inherent to technogenic civilisation. This approach is justified, for by the beginning of the twenty-first century, numerous factors have emerged that pose a genuine threat to humanity on a global scale—so great that they may render life on Earth impossible.

These issues have been the focus of studies by scholars from various countries, including Yu Sang Chang, Seung Jin Baek (*2010*), Helmuth Nyborg (*2012*), and John Smart (*2012*). Scenarios depicting the collapse of civilisation and the demise of the planet have been elaborated by D. MacKenzie (*2008*), Michel Rampino (*2002*), and D. R. Morgan (*2009*). Russian scholars have also expressed concern about the consumerist attitude towards nature and the preservation of life on Earth—issues that affect all nations and continents. Among those addressing such questions are S.V. Alexandrov (*2021*) and O.B. Ivanov (*Basil the Great, 1900*; *Ephraim the Syrian, 1995*), among others.

Of particular interest are those studies assessing the factors that influence the future development and preservation of civilisation and the natural world, which directly correspond to the mental and axiological constants of human worldviews. This issue has been examined by Ian J. Deary, Martin Lawn, Caroline E. Brett, David J. Bartholomew (*2009*), and Sanjoi Som (*2019*).

In this regard, the development and broader introduction of the concept of "cultural intelligence" appear particularly promising. The significance of this concept has been explored by F. Fang, W. Shea, and M. Selart (*2018*). Introduced into academic discourse in 2002, it denotes an individual's ability to interact productively with the world in contemporary sociocultural conditions.

Resistance to technogenic influences and their consequences constitutes a shared task for both humanity and the natural world. For this reason, the present study turns to an analysis of

the philosophical foundations underlying interpretations of the natural world in the heritage of the early Middle Ages—a period devoid of utilitarian or pragmatic attitudes toward nature.

The principal source for all representatives of patristic philosophy in their reflections was the *Book of Genesis* (*The Bible, 1996*)—the first book of the *Old Testament*—which provides an answer to the question of how life and the natural world came into being. This text serves as the cornerstone of Christian ontology. A considerable number of exegetical works by authoritative patristic authors are devoted to interpreting the key ideas of Genesis. These include Irenaeus of Lyon, Nemesius of Emesa, Osius of Corduba, Clement of Alexandria, Cyril of Alexandria, Cyril of Jerusalem, the Cappadocian Fathers Gregory of Nazianzus and Gregory of Nyssa, John Cassian, Maximus the Confessor, and ascetic writers such as Anthony the Great, Macarius of Egypt, and Abba Dorotheus.

In this study, however, the author primarily refers to the works of Origen (*2001*; *2021*), John Chrysostom (*1898a*; *1898b*), Basil the Great (*1900*), Ephraim the Syrian (*1995*), and Isaac the Syrian, or Isaac of Nineveh, (*2008*), as well as Latin patristic authors Jerome of Stridon (*2009*) and Aurelius Augustine (*1912*; *1998*). These authors deserve particular attention because they were instrumental in formulating Christian doctrine and the fundamental directions of religious-philosophical thought, which were subsequently received in diverse medieval concepts and significantly influenced Russian religious philosophy.

Results

The foregoing analysis of studies demonstrates that insufficient attention is currently paid to ethical and axiological problems in interpretations of the natural world and human attitudes towards it.

The article reveals interpretations of nature as a source for understanding metaphysical, existential, and ethical-axiological meanings in Patristic philosophy, which became fundamental for the comprehension of medieval mental culture. Since the world is the result of the superabundance of divine love and creative power, everything inhabiting the natural world bears within itself the reflection of the divine design. Origen, John Chrysostom, Basil the Great, and the eminent Christian ascetics and writers Ephrem the Syrian and Isaac the Syrian perceived nature as a reflection of ethical and axiological notions revealed in the Scriptures and understood as a form of divine instruction. Therefore, the natural world is considered something that has a direct and immediate relation to every human being, testifying to their participation in divine being and bringing them closer to God.

However, alongside this principal idea, Origen, John Chrysostom, Basil the Great, and the Christian ascetics and writers Ephrem the Syrian and Isaac the Syrian also address another circle of issues: the original purpose and meaning of the creation of the natural world, the causes and essential characteristics of animal nature, the comparative features of the human and animal soul, the posthumous destiny of living beings, the duties of humans towards animals, and the impact of original sin on the transformations that befell nature.

The reasons for the creation of the natural world contain ontological meanings, the comprehension of which should contribute to the assimilation of Christian axioms. Origen, John Chrysostom, Basil of Cappadocia, Ephrem the Syrian, Isaac the Syrian, and other representatives of Patristic philosophy speak of another, yet equally fundamental task for

humanity in the process of studying nature and its laws—namely, spiritual transformation and transfiguration.

Discussion

The question of the status of nature within the horizon of Patristic thought refers us to the biblical premise that humankind, like nature and everything in creation, was created by God.

In Christian exegesis, the text of Revelation presupposes not only a literal but also an allegorical interpretation, uncovering a diversity of contexts and meanings. Hence, symbolism as a principle for understanding reality in its relation to the celestial realm becomes the foundation of Christian thought, while questions concerning attitudes towards nature and the comprehension of its laws are expressed in an ethical-symbolic mode.

For the Christian ascetic and thinker Ephrem the Syrian, the object of contemplation is the very sequence of creation—that God created the natural world, plants, and animals before humanity. In this fact, he perceives the fullness of divine mercy: God created the world before humankind so that later sinful acts would not violate the Creator's primordial design. According to Ephrem, humanity's fall had a destructive effect upon the natural world, signifying the impossibility of continued existence. Yet for humankind this would mean an even more dreadful consequence in a theocentric perspective—the complete loss of hope for redemption.

Ephrem the Syrian analyses in detail the properties of the natural world, the foremost of which he identifies as its beauty and perfection. In the beauty of divine creation, he sees a source of spiritual growth for the first humans in Paradise. This is particularly evident in the Tree of the Knowledge of Good and Evil, whose attractiveness incited resistance to temptation. God therefore hid it from the eyes of the ancestors, but "gave them only a commandment, which was not so great as to equal the overflowing reward prepared for them" (*Ephraim the Syrian, 1995, p. 238*). This fact, Ephrem believes, contains profound meaning and testifies that God had a definite plan, implying further prospects for the development of humankind had it not sinned. Remarkably, Ephrem seeks confirmation of his reflections on the reasons for the creation of the natural world in other books of the Old Testament.

The theme of the meaning of the natural world is also addressed in the Homilies on the Book of Genesis by John Chrysostom, a representative of Greek-Eastern Patristics. From his viewpoint, humankind must reconcile itself with the unknowability of many phenomena and the impossibility of answering the question concerning the reasons for the creation of nature, since no one can penetrate the depths of the divine plan. This enigma contains a divine lesson for humankind. John Chrysostom resorts to rather unusual examples for his time to clarify his idea: the existence of whales, unseen by most people, cannot justify questions about their usefulness or value, for such questions amount to murmuring against God. Therefore, it is improper for humans "to reproach creation [divine] merely because you do not know its purpose… If you are prudent, you can from these creatures discern both the might and the ineffable benevolence of the Lord" (*John Chrysostom, 1898b, pp. 53–54*).

The reasons for the creation of the natural world embody ontological meanings, the comprehension of which assists in adopting certain moral principles of Christianity—humility and the constant striving for divine knowledge.

In Hexaemeron, Basil of Cappadocia poses the question of the causes of creation in a completely different way: nature itself is direct evidence of divine creativity, alien to chaos and irrationality. The aesthetics of being constitute a principle underlying nature. Augustine expresses a similar idea, yet his attention centres on how "without any change in Himself, He creates what is changeable and temporal" (*Augustine, 1998, p. 316*), a thought he further develops in On the Literal Meaning of Genesis (*Augustine, 1912*).

In this work, the manifestations of God's will are most vividly revealed. Like other thinkers of Greek-Eastern Patristics, Basil the Great maintains that the essence lies not in studying nature per se, but in discerning its inherent properties—of animals, birds, and other natural phenomena: "The fish do not transgress the divine law, while we humans neglect salvific precepts. Despise not the fish for their silence and lack of reason, but fear lest you become more irrational than they through opposition to the Creator's ordinance." (*Basil the Great, 1900, p. 114*)

Basil of Cappadocia demonstrates that within nature there are lessons for human spiritual life: features of animal behaviour, the habits of birds and even insects, and examples of conduct reflecting moral principles. He cites the bee, an image of meekness and diligence, and the turtledove, which "when parted from its mate, will not consort with another, but leads a solitary life in memory of its former companion. Hear, O wives, how honourable is widowhood, preferred even by speechless creatures to the shame of multiple unions." (*Basil the Great, 1900, p. 130*)

The natural world is thus a special book in which the chief principles of Christian ethics and axiology—virtue and vice—are vividly inscribed by the Creator's hand. Basil the Great gives examples from the life of eagles, who exhibit both injustice towards their fledglings and the custom of adoption. Though animals are speechless, the natural world possesses its own distinct characteristics: "The ox is steadfast, the ass indolent, the horse ardent in lust, the wolf untameable, the fox cunning, the deer timid, the ant industrious, the dog grateful and faithful in friendship. The lion is born fierce, solitary, unsociable with beasts of its kind. As king of the speechless, by its inborn pride it endures no equals." (*Basil the Great, 1900, p. 140*)

Yet the principal example given to humankind through animal behaviour, according to Basil of Cappadocia, is the care for the chief aim of earthly existence—the salvation of the soul—just as beasts strive to preserve their lives.

In Hexaemeron, Basil the Great also addresses the nature of animal souls, drawing a parallel with the human soul and concluding that their foundations are entirely different, for the animal soul is bound to matter. Hence, he categorically rejects the idea of metempsychosis. On the basis of comparisons between human and animal souls, Basil demonstrates their incomparability, asserting that the superiority of the human soul justifies its right to govern the natural world.

Reflections on the nature of animal souls appear much earlier among the apologists. Thus, Origen concludes that "the blood of all animals is their soul" (*Origen, 2001, p. 149*), relying on the Old Testament prohibition against consuming the soul with the flesh [Leviticus 17:13–14]. Since blood is a material substance, Origen infers that the soul shares its properties. He further compares the universe with the natural world: "The whole world must be regarded as an immense living being sustained, as it were, by a single soul, the power and reason of God." (*Origen, 2001, p. 104*)

John Chrysostom holds that the fall of Adam and Eve disrupted the order of the natural world, distorting it. Many animals thus became dangerous to humans—something absent from the Creator's original design—for in Paradise "the beasts bowed before man as their lord; but when we were deprived of boldness and honour, we ourselves began to fear them." (*John Chrysostom, 1898a, pp. 740–741*) His reasoning rests on the passage from Genesis where Eve, seeing the serpent, felt no fear.

Many saints wrote that the world as a whole, and the natural world in particular, changed after the Fall, because God cursed the earth. Yet Blessed Jerome makes a crucial clarification: after the Fall, God cursed not the earth or the labour of its cultivation, but human sins (*Jerome of Stridon, 2009*).

The Syrian ascetic and writer Isaac the Syrian regards as a special virtue the "heart that shows mercy to every created being." He characterises this property as follows: "The burning of the heart in compassion for all creation—for men, for birds, for animals, for demons, and for every creature. At the remembrance and sight of them, a man's eyes shed tears through the immense and vehement pity that presses upon his heart… he cannot endure to hear or see any harm or even the slightest sorrow suffered by a creature." Isaac the Syrian speaks of the necessity of praying for all living beings and for the natural world (*Isaac the Syrian, 2008, pp. 253–254*). A similar attitude to creation is found in St Francis of Assisi, whose principle became part of his concept of spiritual experience. He interpreted freedom as a divine gift bestowed upon all beings and held that irrational creatures possess greater freedom than humankind. His preaching of liberation from earthly goods was realised in his life.

Conflict of Interest

The author declares that there is no conflict of interest.

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Yury G. Geltser [a][12]

General Laws of Nature, Society, and Thought as the Philosophical Foundation of the General Systems Theory in the Methodological Approach to Cognizing the World: A Philosophical Solution to the Physical-Mathematical Theory of Strings [11]

Abstract:
Contemporary philosophy requires a reconsideration of the universal laws of being, since the classical dialectics of the 19th century, based on the ideas of infinite development and linear causality, no longer correspond to the scientific worldview of the 21st century. In the age of synergetics, cybernetics, and systems thinking, there emerges the necessity of creating a new methodology capable of uniting natural, social, and intellectual processes into a single ontological model. The research is aimed at providing a philosophical justification of the general regularities of nature, society, and thought as a unified system functioning according to the laws of homeostasis and self-regulation. The novelty of the study lies in the development of the concept of *limited dialectics*, in which development is considered not as an endless sequence of quantitative and qualitative transitions, but as a dynamic balance between stability and variability. The author for the first time philosophically interprets homeostasis as a universal law of being, integrating physical, biological, and social forms of matter, and acting as a regulator limiting chaotic processes. The subject of the study is philosophical consciousness, seeking to comprehend the systemic organisation of the world and to identify the laws of its self-preservation. The object of the study is the systemic organisation of being, including natural, social, and intellectual structures capable of self-organisation and of maintaining their internal parameters of existence. The purpose of the research is to reveal the interrelation between the general laws of nature and dialectical principles through the prism of the systems approach, as well as to formulate universal laws of stability that connect philosophy with the natural sciences. The study employs systems analysis, induction and deduction, modelling, analysis and synthesis, dialectical, gnoseological, phenomenological, comparative-historical, and philosophical-modelling methods, which together ensure an integral examination of natural and social systems as self-organising structures. The research demonstrates that the stability of any system is based on the operation of the universal law of homeostasis, which restricts the range of permissible changes and prevents the destruction of structures; chaos, in turn, is interpreted as a transitional state necessary for the self-renewal of systems and their transition to a new level of order. The author formulates a number of philosophical conclusions: homeostasis is a fundamental property of matter that ensures its evolutionary stability; chaos is not the opposite of order, but the mechanism of its restoration; and the laws of nature, society, and thought form a single system in which quantitative parameters, qualitative states, and teleological function are in inseparable interconnection. Thus, the proposed concept of *limited dialectics* forms the foundation of a new philosophical paradigm — the *systemic dialectics of sustainable being*, which unites natural-scientific and humanitarian approaches to understanding the universal order of the world.

Keywords: system homeostasis, limited dialectics, systems philosophy, universal laws of nature, society and thought, chaos and order, self-organisation of matter, sustainable development, systems analysis, philosophy of homeostasis, synergetic methodology.

Abbreviations:

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Introduction

Modern philosophy has entered a stage of rethinking the universal laws governing the development of matter and consciousness. The traditional dialectical principles formulated in the 19th century no longer meet the requirements of the 21st century, in which the boundaries between physics, biology, cybernetics, and social theory are rapidly dissolving. Under these conditions, the search for a new methodology capable of uniting the universal regularities of nature and society into an integrated system of knowledge becomes particularly relevant. The need for such integration is determined not only by scientific but also by civilisational factors: humanity has found itself facing the threat of the destruction of natural and social homeostats—stable systemic equilibriums that ensure the existence of life and culture.

The relevance of the study lies in the attempt to develop a philosophical foundation for a general systems theory that unites material, social, and cognitive processes within a single categorical framework. Unlike traditional dialectical materialism, the study proposes a concept of *limited dialectics*, in which the development of matter is subject to the laws of homeostasis, self-adjustment, and cyclic variability.

The novelty of the work lies in the philosophical interpretation of physical constants and systemic parameters as manifestations of universal laws of stability. These laws are considered not metaphysically, but as real forms of the existence of matter in a state of dynamic equilibrium.

The subject of the study is philosophical consciousness striving to comprehend the universal regularities of nature, society, and thought.

The object of the study is the systemic organisation of being—the totality of natural, social, and intellectual structures governed by the laws of self-preservation, variability, and interaction.

The study aims to reveal the interrelation between the general laws of nature and the dialectical principles through the prism of the systems approach, demonstrating that homeostasis functions as a universal limiter of chaotic processes and as a form of stable existence of matter.

To achieve the stated purpose, the following objectives are set:

- analyse the classical laws of dialectics and identify their limitations in explaining modern scientific data;
- formulate the concept of homeostasis as a universal philosophical law that unites physical, biological, and social processes;
- substantiate the idea of self-adjustment in natural systems and their ability to maintain internal parameters of existence;
- demonstrate the relationship between quantitative constants and qualitative forms of being that determine the evolution of systems;
- define the homeostatic model of social development and its distinctions from traditional Marxist interpretations of dialectics.

Thus, the work is aimed at creating a coherent philosophical foundation for a new universal methodology capable of integrating the achievements of the natural sciences and philosophy, thereby providing a harmonious understanding of the world as a self-developing yet structurally constrained system.

Methods

The study is based on a combination of general scientific and specialised philosophical methods, which make it possible to consider natural, social, and intellectual processes as interconnected aspects of unified being. The application of these methods is aimed at substantiating the universal regularities of the sustainable existence of matter and at identifying systemic mechanisms of self-regulation that underlie the laws of nature, society, and thought.

Among the general scientific approaches, a central place is occupied by *systems analysis*, which ensures a holistic understanding of the interaction between elements and structures within natural and social systems. On its basis, a proposition has been formulated that homeostasis functions as an objective constraint of dialectical transformations. Systems analysis made it possible to examine not only the internal interrelations within a system but also its capacity for self-organisation, that is, for maintaining internal equilibrium under changing external and internal conditions. Through this approach, the role of quantitative constants determining the stability of matter and acting as philosophical analogues of measure in classical dialectics is revealed.

The methods of *induction* and *deduction* provided the logical structure of the research. Induction, based on concrete facts from physics, biology, and economics, made it possible to generalise observed regularities in the form of a universal principle of systemic self-adjustment, whereas deduction enabled the derivation of new laws governing the dynamics of transitions between equilibrium and chaos. Thus, empirical material acquired philosophical meaning, and philosophical categories were correlated with modern scientific discoveries.

Modelling served as an important methodological instrument, allowing the visualisation of the interaction between external and internal factors of system stability. The constructed models—such as the systems "Earth" and "State"—illustrated the ratio of direct and feedback connections, showing how homeostasis is disrupted and restored. This method helped to demonstrate that the development of systems is nonlinear and characterised by periodic phases of tension and recovery, thereby confirming the law of the nonlinearity of homeostasis.

The application of *analysis* and *synthesis* ensured the transition from a fragmented study of facts to the construction of a coherent philosophical concept. Analysis made it possible to reveal the internal structure of dialectical laws, their limitations and contradictions, while synthesis united the obtained results into a single theoretical system encompassing both natural-scientific and socio-philosophical elements. As a result, the research acquired an interdisciplinary character that transcends the boundaries of traditional philosophy, integrating achievements from physics, biology, sociology, and systems theory.

A special role is played by *specific philosophical methods*, which provided a deepening of theoretical analysis. The *dialectical method* was not only an instrument but also an object of critical re-evaluation. Its classical forms—the transition from quantity to quality, the negation of negation, and the unity and struggle of opposites—were subjected to philosophical clarification in the light of the systems approach. In this new interpretation, dialectics appears not as infinite motion but as a regular interaction of processes of stability and variability governed by the principles of homeostasis.

The *gnoseological method* made it possible to examine the interrelation between being and cognition, between material structures and their ideal reflections. In this context, the

development of philosophical knowledge is presented as a self-developing system subject to the same laws of stability as nature itself. Understanding cognition as an element of homeostatic equilibrium opened the way for synthesising ontology and epistemology within the framework of the general systems theory.

The *phenomenological method* provided an opportunity to describe the states of homeostasis and chaos as paired categories that mutually determine each other. Through this method, chaos ceases to be perceived solely as destruction; on the contrary, it is interpreted as a transitional stage necessary for the self-renewal of systems and the formation of new order. Thus, the phenomenological approach revealed the dynamic equilibrium of being, in which destruction and creation act as moments of a unified process.

The *comparative-historical method* was applied to reveal the continuity between philosophical and natural-scientific approaches. The comparison of Hegelian dialectics, Marxist theory, Prigogine's synergetics, and Haken's systems concept made it possible to demonstrate the evolution of philosophical thought from speculative models of development to a systems methodology based on empirical and structural data.

Finally, the *method of philosophical modelling* made it possible to integrate abstract categories with concrete structures of reality. It enabled the construction of conceptual schemes demonstrating how the universal laws of nature, society, and thought operate at different levels of material organisation.

Taken together, these methods made it possible to substantiate a holistic concept of the systemic unity of the world, where homeostasis appears as the principal mode of existence of matter and chaos as its mechanism of renewal. The philosophical significance of the obtained results lies in the establishment of *systemic dialectics* as a new methodological paradigm capable of uniting the natural and social sciences on the basis of common principles of stability and development.

Literature Review

The philosophical comprehension of the systemic nature of the world, the stability of matter, and the laws of self-organisation is grounded in a wide range of theoretical and interdisciplinary sources united by a common focus on the search for universal principles of being. Among them, a key place is occupied by works that laid the foundations of the general systems theory, synergetics, the theory of homeostasis, and the philosophy of sustainable development.

At the centre of the systems approach stands the fundamental work of Artyukhov, *General Systems Theory: Self-Organisation, Stability, Diversity, Crises* (*2014*). The author formulates the principles of self-organisation, homeostatic equilibrium, and stability, revealing systemic regularities through the concepts of feedback and crisis phases of development. Artyukhov emphasises that any system exists in a dynamic balance between stability and variability—an idea that coincides with the central position of the present study. His conclusion that "the stability of a system is a measure of its capacity for self-regulation" (*Artyukhov, 2014, p. 112*) underlies the author's concept of homeostasis as a philosophical law of being.

The systems approach is further developed in the works of Dragobytsky (*2013*), where systems analysis is treated as a method for understanding and managing complex economic and

social structures. Dragobytsky stresses the necessity of identifying invariants of systemic functioning and establishes the interrelation between stability and optimality. His formulation of the system cycle "input – process – output", in the philosophical interpretation of the author of the present study, acquires a metaphysical meaning as a universal law of conservation.

Research within the framework of the general systems theory also includes the studies of Nikanorov (*2002*; *2008*), who proposed theoretical-system constructs for analysis and design in engineering and conceptual domains. Nikanorov demonstrated that systemness is not merely a methodology but also an ontological characteristic of the world: "the system is not a form of thought but a form of being." (*Nikanorov, 2008, p. 47*) This very idea is developed in the present work, where the systemic organisation of being becomes the philosophical foundation for the universal laws of nature, society, and thought.

A considerable contribution to understanding the principle of homeostasis and its philosophical content was made by Urmantsev (*2007*). His book *The Symmetry of Nature and the Nature of Symmetry* reveals the interrelation between symmetry, stability, and the structural organisation of matter. Urmantsev emphasises that "symmetry is the universal measure of the orderliness of systems" (*Urmantsev, 2007, p. 58*), which directly correlates with the author's interpretation of homeostasis as a state of ultimate order allowing only functional fluctuations within permissible parameters.

The essential theoretical basis of modern philosophy of self-organisation was formed by Haken (*1980*), the founder of the science of synergetic. He demonstrated that complex systems possess the property of non-additivity—that is, their integral properties are not reducible to the sum of the properties of their elements. For the philosophy of systemness, this implies a transition from linear models of development to non-linear ones, which in the author's study is expressed in the concept of "limited dialectics"—a dialectics recognising the boundaries of change and the cycles of self-organisation.

Next to Haken stands Prigogine (Prigogine), who in his book *Order out of chaos: A new dialogue between man and nature* (*2005*) developed the idea of self-organising systems capable of passing through instability towards new forms of order. Prigogine and Stengers revealed the philosophical meaning of chaos as a mechanism of renewal rather than destruction—an interpretation directly employed by the author when formulating the law of chaos as the phase of a system's transition to a new homeostasis. In this context, the work of A.I. Prigozhin (*2010*) is also significant; it addresses the problem of goal-setting and values as factors of managing the future. The author extends this idea to the level of universal systems, demonstrating that the target function acts as a regulator of systemic equilibrium.

In the works of Kapitsa (*2010*) and Golansky (*1992*), demographic and economic regularities of global processes are examined. Kapitsa formulates the paradoxical laws of human growth, explaining the acceleration of development through non-linear dependencies. His conclusion about the approach to the limits of quantitative growth is interpreted by the author as confirmation of the existence of objective constants of homeostasis. Golansky, analysing the "economic forecast against utopias", points out the danger of extensive development—a thesis employed in the present study to criticise the Marxist understanding of productive forces and economic growth.

The principle of systemic self-organisation finds confirmation in physics, where the ideas of Curie (*1996*) on the symmetry of electric and magnetic fields demonstrate the fundamental properties of equilibrium. Curie wrote that "every breaking of symmetry produces a phenomenon" (*Curie, 1966, p. 15*), and by this statement he effectively anticipated the idea of the dialectical connection between chaos and order. Pasteur (*1960*), investigating molecular dissymmetry, showed that asymmetry is the source of the evolution of life forms—an idea resonating with the philosophical thesis advanced in this research that the stability of the world requires measured variability.

In the context of natural-scientific analogies, the works of Linde (*2007*) are also of significance. He proposed inflationary cosmology as an explanation for the uniformity and self-maintenance of the Universe. Linde's concept, describing cyclic phases of expansion and contraction, is used by the author as the metaphysical basis for the fifth and sixth laws of limited dialectics—life cycles and the boundedness of chaos.

Alongside physical models, an important role in the philosophical substantiation of systemness is played by recourse to socio-philosophical and cultural sources. V.S. Egorov, in *Philosophy of the Open World* (*2002*), asserts the idea of the dualism of the material and the ideal, noting that manifestations of the ideal may be interpreted as "reflections of the regularities of self-preservation of being". This position supports the author's hypothesis regarding the existence in nature of a "rational principle of self-regulation".

The historical and philosophical lineage of the study goes back to Lenin (*n.d.*), who in *Karl Marx* systematised the dialectical laws and identified their universal mechanisms of development. Lenin's understanding of dialectics as "the universal interconnection of processes" (*Lenin, n.d., p. 55*) serves as a point of departure for the reinterpretation in the present research, where development is viewed not as infinity but as self-regulation within the boundaries of homeostasis.

Reflection on modernisation and developmental cycles is expressed in the author's own earlier publications (*Geltser, 2010*; *Geltser, 2022*), where the concept of "limited dialectics" was first introduced as an alternative to the linear model of historical progress. These earlier works illustrate a transition from social philosophy to systemic ontology, making the current article a logical continuation of preceding research.

The critical aspect of the evolution of society and philosophy is also presented in the works of Solntsev and Rozhkov (*2008*), who developed the discipline of contradictology—the science of contradictions. Their idea that conflict is not destruction but a source of development corresponds with the author's interpretation of chaos as a mechanism of transition to a new order.

Among scholars exploring the relationship between humanity and civilisational development, Panov (*2010*) stands out. In analysing Khaitun's book on the phenomenon of the human being in the context of universal evolution, Panov points to the systemic interconnection between the anthroposphere and the cosmos, which corresponds with the author's thesis concerning the inclusion of humankind within the general laws of being.

The epistemological and gnoseological prerequisites of systems thinking are found in the works of Yudin (*1981*), the author of the article "*Development*" in the *Great Soviet Encyclopaedia*. Yudin defines development as "an irreversible, directed, regular change of material and ideal

objects" (*1981*); however, the author of the present study refines this definition by introducing the parameter of homeostasis, which limits development without destroying its directionality.

Certain sources have the character of philosophical essays or socio-cultural reflections on systemness. Thus, Bushkov (*2007*) and Vasserman (*2012*), addressing the problems of modern society and historical paradoxes, focus on the crises of rationality and the collapse of stable forms of thinking. Although their texts are not academic studies, the author employs them as illustrations of the degradation of social homeostats and the violation of moral and cultural constants.

Special mention should be made of the work of Rozental (*1980*), published in *Advances in Physical Sciences*, which analyses the fundamental physical constants. His assertion that "constants determine the permissible range of existence of matter" (*Rozental, 1980, p. 245*) directly corresponds to the philosophical conclusion of this study that homeostasis acts as "an objective limiter of dialectical transformations."

The idea of the interrelation between systemic laws and the spiritual dimensions of being resonates with the works of the author (*Geltser, 2010*; *Geltser, 2022*) and Egorov (*2002*), who view the interaction of nature and consciousness as a unified process of the world's self-comprehension. These authors assert that philosophy must integrate data from the natural and human sciences within a meta-disciplinary synthesis—an approach fully realised in the present study.

Thus, the analysis of the examined sources demonstrates that the methodological foundation of Gelzer's article is formed at the intersection of three lines: classical dialectics (Hegel, Lenin); systems methodology and synergetics (Artyukhov, Nikanorov, Haken, Prigogine); and physico-cosmological concepts of order and chaos (Curie, Pasteur, Linde, Rozental). These directions are unified by the author into the philosophical paradigm of *limited dialectics*, in which development is understood as a process of dynamic equilibrium and homeostasis is regarded as the universal law of the existence of matter, ensuring the continuity and stability of the universe.

Results

Philosophical Foundations of Limited Dialectics and the Homeostatic Systemicity of the World

Dialectical materialism, as is well known, rests upon three "pillars", three universal laws—the transformation of quantity into quality, the negation of negation, and the unity and struggle of opposites. It cannot be said that these laws were derived speculatively; by the mid-nineteenth century, there already existed a substantial body of facts confirming their validity. Yet a law, once established, requires further confirmation in newly discovered facts. And if certain facts cast doubt upon it, it cannot always be concluded that the worse for the facts.

Let us begin with the law of the inevitability of the transition from quantitative accumulations to qualitative changes. This law, like all laws of dialectics, was conceived as a sequence of inevitable transformations and was regarded as universal. However, the twentieth century revealed at least two quantitative limits of existence: the motion of matter is restricted

by the speed of light, and the temperature of physical bodies cannot fall below absolute zero, that is, –273.15°C.

Furthermore, it has been established that the stability of the world is based on a series of quantitative constants, "finely tuned" so that under these conditions all that exists, including life (as we understand it), can be sustained. Should nuclear forces increase, stars would burn out too rapidly for life to arise and evolve nearby; should they decrease, stars would never ignite at all — and naturally, life could not exist in that case. If the force of gravity were increased, our Universe would swiftly perish in a Big Crunch; if slightly reduced, it would expand too rapidly and freeze (*Kaku, 2009, p. 329*). There are dozens of such constants related to our Universe, and the "fragility" of some of them is astonishing.

Deuterium plays a key role in nuclear reactions. If the binding energy of the particles in its nucleus were lower by as little as two-hundredths of a percent, stars would not exist at all. The proton is 1,836 times heavier than the electron; were this ratio even slightly different, neither atoms nor molecules could form.

With regard to life on Earth, such constants are even more numerous. "If the Earth were closer to the Sun, water would not condense, and oceans would never have formed. If the Earth were farther away, it would be entirely covered with glaciers, which would certainly not favour the emergence of life… The speed of the Earth's rotation, once again, seems almost specially designed for the calm development of life. If it were slightly slower, the Earth would fall into the Sun; if slightly faster, it would fly off its orbit and out of the Solar System altogether. The proportion of oxygen in the atmosphere, again, has somehow been 'adjusted' for life on Earth. Were it lower, combustion would be impossible; were it higher, even soaked wood would flare up from the tiniest spark like gunpowder…" (*Bushkov, 2007, pp. 189–190*)

Similar stable quantitative parameters are observed in biological organisms. The pH level in the human body cannot deviate from 7.36–7.40 by more than one unit. A specific level of osmotic pressure is maintained between intra- and extracellular fluids, as are the temperature of the body and internal organs, and the volume of circulating blood.

There are dozens of such parameters, and this cannot be a coincidence. Many scientists perceive here "the hand of God". We do not deny the legitimacy of this hypothesis, yet from a scientific point of view such references yield no explanatory value. We neither receive an answer as to why or how this occurs, nor can we avoid clarifying what exactly we mean by the term "God". Still, we would prefer not to discard this hypothesis from theory as one unworthy of consideration. Professor Egorov (*2002*) interprets this as the manifestation of the ideal alongside the material aspect of the world. By the "ideal" one may understand God, the Higher Mind, or the Absolute Spirit. The essence of this ideal remains unknown to us, though its manifestations are observable.

Our hypothesis, however, is that every natural system forms the quantitative parameters of its existence and "protects" them. These systems are self-adjusting by their very nature. Otherwise, nature—the world of being—could not exist.

Exceeding these parameters is possible, but this entails the following:

- the destruction of the system;
- the establishment of chaos;

- after a certain time, the re-emergence of a new system with new parameters (whether it will include humankind, no one can say).

Yet, if one assumes that the fundamental constants cannot be altered, the new system will transform but without undergoing essential changes. Naturally, the notions of "essential" and "non-essential" change are highly relative. The loss of atmosphere or a magnetic field by a planet could be considered "non-essential" for the preservation of the planet itself, yet these circumstances would inevitably lead to the extinction of the life processes upon it.

It is undeniable that the world is mutable, but this mutability is of a gentle nature in relation to natural constants. Departures beyond their limits are catastrophic, though the intervals between such catastrophes are measured in cosmic time—millions or even billions of years.

We assert that the capacity for active self-preservation constitutes a mode of existence of matter organised in a particular way, which in turn represents one of the fundamental forms of the motion of matter.

Such systemic stability in science has been termed *homeostasis*. The homeostasis of systems is the objective limiter of dialectical quantitative and qualitative transformations. The state of natural systems in homeostasis is the most widespread form of the existence of matter.

This is the first universal law, and it must be supplemented by the law of impossible and undesirable changes of matter in a state of homeostasis, which lead to the destruction of material systems. It may be formulated as follows: "The motion of matter and material formations does not exclude but, on the contrary, presupposes the existence of prolonged or even permanent states called homeostasis. Each homeostasis is characterised by its own parameters of quantitative and qualitative attributes. Any disturbance of them is either impossible or undesirable for the existing system, unless one intends to destroy the established homeostasis (e.g., the state of disease) or is unable to halt its destruction (for example, the occurrence of human death)."

Hence, we derive the algorithm: the transformations of matter are possible only within certain limits, but nature itself develops resilience against excessively radical alterations.

Homeostasis is one of the fundamental forms of the existence of matter, ensuring its stable condition and evolutionary development.

It must be acknowledged that here we encounter one of nature's enigmas. The homeostasis of biological systems is regulated by the functioning of the brain and the nervous system; the homeostasis of social systems is also achieved through a particular system of governance. Yet we cannot say by what mechanism the homeostasis of terrestrial life and cosmic processes is maintained. Possibly this occurs through cycles and exchange functions, though their interrelation remains far from fully understood. In this system there appears to be a missing governing structure, although it most likely exists, still beyond our comprehension.

According to several scientists (*Linde, 2007*; *Panov, 2010*; *Rozental, 1980*), the significance of the constants is even more profound and "conservative" than we describe: "…Just as the self-organisation of an animal is encoded in its genetic code, the self-organisation of the entire Universe is encoded in the values of the fundamental constants…" (*Panov, 2010, p. 164*). The only point of disagreement lies in the assumption that the self-organisation of an animal is exhausted by its genetic code. For self-organisation also requires continuous adaptation, ensured by the brain and the nervous system. Moreover, the constants are most likely the external

manifestation of some genetic code of the Universe itself—a mystery for which, at present, no answer exists.

The consequence of the second universal law of nature, society, and thought is the assertion that nature recognises neither the metaphysical Hegelian "bad infinity" nor the dialectical Marxist infinity, which is equally "bad" in its essence. All parameters of nature are limited in one way or another. The infinity and timelessness of the Universe are relative and incompatible with the state of homeostasis.

What, then, are these parameters? It is commonly assumed that we live in a three-dimensional space, or, if the time parameter is included, in a four-dimensional one. Yet it is believed that there exist worlds possessing many more dimensions. I shall now attempt to refute this notion.

The world we inhabit has such a parameter as speed. It varies among different material formations, but we are primarily interested in the speed of motion at which we, humans, exist. It can be divided into the following parameters:

- the speed of our motion upon the Earth;
- the speed of the Earth's rotation around its axis;
- the speed of the Earth's revolution around the Sun;
- the speed of the Earth's motion within the Milky Way—i.e., the velocity of our Galaxy's orbit around its black hole;
- the speed of our Galaxy's motion within the Universe.

These are extremely important parameters, as they determine the biological cycles and rhythms of all living beings on Earth.

Furthermore, every object in the Universe possesses a specific temperature regime—this, too, is a parameter of the existence of matter.

Next comes the operative pressure, which can also be subdivided into several categories:

- external pressure, or compressive pressure;
- internal pressure;
- parameters of pressure ensuring the homeostasis of a particular portion of discrete matter;
- inflation of matter, when its internal pressure exceeds the external.

The mass of a body is the most essential parameter regulating matter in space relative to other bodies.

The volume of a material object is of particular importance when the object cannot be easily described by its length, width, and height. Moreover, it allows one to determine the density, or the specific weight, of the matter of which the object is composed. Here, too, one may include atomic weights—parameters that enabled the creation of Mendeleev's periodic table, characterising the structural diversity of matter.

To these parameters one should add the energetic component of matter, calculated using Einstein's formula $E = mc^2$.

Thus, if one counts the velocity of motion as one parameter and the indicators of pressure likewise as one, we obtain six additional parameters for measuring matter, making our space ten-dimensional.

It remains only to wonder why this simple fact passes unnoticed by both philosophers and physicists. Moreover, a ten-dimensional space is precisely what the mathematical framework of string theory demonstrates. Indeed, string theory introduces an eleventh string that serves as the regulator of the previous ten. What, then, does this mathematical model suggest? In the author's view, all parameters of a system can be influenced only by its *target function*, by the change in the system's own purpose. How this algorithm might be expressed mathematically, the author cannot say—perhaps through vectors characterising their synergetic effect—yet there is no doubt that such a task presents no difficulty for mathematicians. Perhaps even string theory has already solved this problem *a priori*.

If the author's assertions are correct, then it is a pleasure to demonstrate how a new methodology can readily resolve problems that only recently seemed unsolvable—mysteries we ascribed to other worlds supposedly existing parallel to our own.

However, that is not all. The mathematical string theory itself and its solution demonstrate that the world is systemic; that the target function is organically linked to the parameters of the system. Our world develops not chaotically but according to a precisely defined target strategy. This constitutes the *third law of limited dialectics*. This law finally demonstrates that there are no general laws of nature, society, and thought existing separately from systemic methodology. It shows that these are aspects of a single, unified methodology, and that the systemic view of the world has philosophical roots.

There exists another misconception in the scientific world — the claim that there is a *systemic approach* and, separately, some *synergetic method* supposedly distinct from it. These individuals have simply failed to grasp the history, essence, and meaning of the concept of *synergetic*. Therefore, it is worth clarifying the matter.

Under the influence of Prigogine's studies on self-developing complex systems in the 1970s, scholars began to discuss the non-additivity of systems with respect to their constituent elements. It was meant that a system, when viewed as the sum of its elements, far exceeds the arithmetic total of its parts in efficiency.

However, the elements within a system are neither merely summed nor aggregated; they interact, forming interconnections. The system and its elements are qualitatively incomparable entities, and any attempt to "sum" elements can be seen as a mathematical error of a school pupil adding together diggers and the soil they have excavated.

Moreover, in *subjective systems*, certain elements taken in isolation are absurd. What, for example, can money represent in an economic system without human beings? Or objects of labour without a subject of labour?

A new understanding, which grew into an independent scientific discipline, was introduced by Haken, under the name *synergetic* (*1980*). Synergetics considers not the elements themselves, but their *functions*—vectorially, in relation to development. The addition of functions acting in the same direction within a system leads to a *synergetic effect*—a nonlinear outcome (or intensification) in the system's development. Thus, the synergetic property is an inherent attribute of systems and cannot be regarded as a separate methodology.

In most systems, including social ones, this effect operates spontaneously. Therefore, the synergetic effort often forms *direct (vicious) links* that, after a certain time, act destructively. If,

however, a subject establishes goal-setting on a scientific basis and acts according to a well-developed plan, it becomes possible to achieve a *super-synergetic effect*.

Even better, if we are able to foresee the inclusion of feedback mechanisms and to deactivate certain synergetic effects in time, transforming them into others.

Nevertheless, Haken, like Prigogine, is not entirely correct. An integral system is not a sum of elements, nor a sum of vectors of functional efforts of structures and elements. The integral system is qualitatively distinct from its components, and the synergetic effect of its functioning represents a qualitatively transformed functionality of its elements and their interrelations.

Then, it is necessary to turn to *scheme No. 1: "Development of the System 'Earth' in Homeostasis"* (*Figure 1*) and *scheme No. 2: "Development of the System 'State' in a State of Homeostasis"* (*Figure 2*). The latter includes a certain DIP structure projecting a model of the society of the future. Such an institute indeed exists, and the author is one of its members.

The circle drawn in dotted lines reflects the integrity and openness of the "Earth" system. The system encompasses both the globe itself and its surrounding atmosphere. The system's integrity is ensured by its constants, the principal of which, in one way or another, define the dimensionality of Earth's space. The "Earth" system is affected by specific external forces that also possess parameters of known constants, some of which have been mentioned above—solar radiation, gravitational forces, electromagnetic fields, and so forth. Even when remaining within the bounds of these constants, they fluctuate, thereby influencing the parameters of terrestrial homeostasis.

The internal structure of the "Earth" system is likewise in motion and affects homeostatic parameters. It is worth recalling that the principal parameter of any system is its *purpose* or *function* (for non-subjective systems, this denotes both direction and movement along a specific trajectory). For cosmic objects, by "purpose" we understand the necessity of being at a specific time in a specific place in cosmic space. Under these external conditions and internal purpose, the system presupposes the preservation of life on Earth in its present form—which constitutes the condition of homeostasis.

The internal system is represented as a complex network of interactions among the Earth's constituent elements, depicted as black points. These interrelations may be *attractive*, forming material coalitions (for instance, earth and ice, or earth and water, giving rise to swamps and other ecological systems). The interactions may be *balancing* one another (as when air masses encounter mountain or forest barriers). But material interactions may also produce *direct links* unbalanced by feedback (e.g., increased solar radiation causing massive forest fires, desertification, and the drying of rivers, which in turn further raises Earth's temperature).

Such direct links begin to exert a destructive influence upon the constants of the entire system. External impacts amplify internal ones, and vice versa. The system's response to these external and internal impacts—the activation of feedbacks—serves to neutralise the threat of destruction and alteration of its "purpose". Generally, direct (vicious) effects accumulate gradually and imperceptibly, whereas feedback processes act "suddenly" and violently, giving rise to crises of varying magnitude.

From this we derive the *fourth universal law of nature, society, and thought: the homeostasis of systems possesses nonlinear parameters of development and is subject to periodic "shocks"*. If the system does not

perish, it strengthens itself by neutralising or completely eliminating direct (vicious) impacts through the inclusion of feedback mechanisms.

Moreover, while direct (vicious) links act gradually, feedback mechanisms most often engage suddenly and operate destructively—yet, paradoxically, preserve the system as a whole.

This is analogous to the way model airplanes are subjected to vibrations and stresses to identify which components detach or break, after which these components are reinforced. The presence of the human being within the system offers hope that its stability will, in time, be maintained consciously—that direct impacts (at least those dependent on human activity) will be detected and eliminated in due course.

However, the homeostasis of any system, like all that exists in the Universe, has its own life cycle. Sooner or later, systems are destroyed or transformed, changing their parameters and "purposes". Hence, we derive the *fifth law*: *Every homeostasis has its own life cycle*. As a result of changes in external environmental conditions and in the system's internal state, the former system either perishes or transitions into a state of new homeostasis. The transitional processes, by historical standards, are rather swift, whereas the adaptation of intra-systemic structures is extreme.

Such processes create specific *phase transitions* in nature, as well as in biological and social systems, disrupting the measured course of evolution—and in modern science they remain poorly understood. It must be emphasised that these are not revolutions accelerating evolutionary processes already present in the old system and consolidating what has already occurred. The nature of these processes lies not in acceleration or completion, but in altering the direction of development as a whole. One such attempt to change the course of social development was the October Revolution of 1917. For this reason, it was called *Great*. Yet from its inception, the new system was burdened with internal flaws that deprived it of dynamism and stability.

It is further proposed to consider how, under the conditions of these laws, the social system called "the State" operates. It must be understood that any diagrams are conventional in nature and are intended to visualise certain complex concepts. They cannot claim ultimate truth or serve as guidance for any specific actions.

In scheme No. 2 (*Figure 2*) an open system is likewise depicted, possessing an internal structure and external impacts. The goal of the social system must be strictly regulated by the society that constitutes it. However, a capitalist society, or rather its ruling elite, either conceals its true goals or seeks to isolate society from influencing their regulation. At the same time, it is crucial that the goal of society should not go beyond the bounds of the field of justice. This requires strict adherence to the postulate that public values are higher than goals. In general terms, public values create the field of justice. A goal's departure from the corridor of public values automatically renders unjust the entire set of relations within the system. It is by these requirements that our approach differs from the Marxist one. We have neither base nor superstructure. All requirements for the goal move inside the system and extend to every interrelation. Each interrelation, in turn, must be examined by the criteria of morality, legal soundness, the requirements of culture, popular traditions, and all that which, in Marx, is included in the superstructure. There is no place for economic determinism. Quite the contrary,

it is the justice of systemic interrelations that ultimately determines its dynamics and social success.

In scheme No. 2 (*Figure 2*) what is depicted is precisely an unjust society. Like any system, the system "State" has its own quantitative–qualitative constants. We are not, however, currently concerned with identifying them. In their place, we have designated power structures concerned with maintaining control over the preservation of these constants. We have listed them on the left-hand side of the scheme in the sequence from 1 to 10 and have shown them around the borders of the system "State" in the diagram.

What will these forces of influence be directed towards first and foremost in an unjust society? History provides an unambiguous answer: towards the atomisation of society that stands against injustice and for changing the goals of the system, and towards the consolidation of that other part of society which is interested in unjust goals. Most often, society is presented with false goals intended to mislead the masses. Frequently the ruling elite does not confine itself to one false goal, but produces yet another false goal. In this way a semblance of an alternative is created. And with the help of this, a semblance of a struggle for justice is created. Thus, in 1996 Russia was confronted with a choice: the liberals headed by Yeltsin or the communists headed by Zyuganov.

For a reasonable person it is often difficult to understand that, contrary to the Russian proverb, one must not choose between two evils at all. Evil must not be chosen under any circumstances.

The atomisation of society is depicted by us as the fragmentation of the interrelations of the social system. However, no matter how much the authorities are disposed against anti-systemic elements, their chief function is the provision of social unity. In conditions where the authorities are unwilling to change their ideology under the influence of anti-systemic currents, the implementation of the function of uniting society is achieved by seeking an enemy—external or internal. Anti-systemic groups are suppressed or expelled from the state. An approximate list of the system's elements is indicated in the lower right-hand corner. Within the system is indicated the PID structure we have mentioned, which seeks to change the system.

There may be many such structures in society. A totalitarian society strives to destroy them in the bud. An authoritarian society, for a time, allows them to exist until it sees in a particular structure a threat to its power.

What might the activity of this structure (PID) be directed towards? Having united within itself a significant number of scholars and active citizens, it has set its sights on creating a scientific model of the society of the future. On the basis of this model, it is intended to unite the masses in the struggle to build this society in practice. The PID has designated itself not only as a society of designers of the future but also as a public movement. However, as of today, it lacks the forces capable of creating and leading any movement for the consolidation of society with the aim of changing the existing system. Possibly they will appear in time. However, then this structure will face destruction at the hands of the authorities. It is important to preserve itself until the moment of social bifurcation (turmoil), to act at that moment as a more or less organised force. Without practical steps to implement its plans, the DIP risks remaining a gathering of "armchair" philosophers endlessly arguing about various aspects of their utopias.

Do constants exist in the economy? Undoubtedly. Of course, these are not constants of the physical world. The mechanistic transfer of such parameters would be a crude error. However, constants do exist, and one must have an understanding of them. These are, above all, the ratios about which nineteenth-century political economy knew more than contemporary economists. First and foremost, this is the rate of interest on loans, which in total is a part of the profit obtained in production, and by definition cannot exceed this profit—otherwise production stagnates and degrades. Taxes are also a part of profit. Their sum must be such that an investment component remains within this profit. When depreciation is "eaten up" along with profit, and the whole business turns into a semi-legal one, then talk of "modernisation" is nothing more than empty chatter.

However, there are also errors. One of them is the proof of the necessity of the outstripping growth of means of production over the growth of means of consumption. Golansky (*1992*) quite correctly proves that these are the proportions of extensive development. Production for the sake of production in the USSR lost its social significance, engendered shortages and disproportions in employment, the boundless waste of resources and the rejection of scientific achievements. Everything new that is struggled for in a capitalist economy had to be "introduced" in the USSR—literally by means of kicks and obscene language—most often unsuccessfully.

In conditions where society is authoritarian, and power is concentrated in the hands of officials and the security apparatus closely interconnected with large capital, the principal parameter of the economy becomes the money supply which this group of people is regularly able to appropriate through corruption schemes. The hopes of the population that at some point saturation will occur and this money supply will begin to decrease are groundless. If there are no objective prerequisites for this (e.g., a fall in oil prices and, in connection with this, a decrease in rent payments), then on every suitable occasion this mass will only increase.

Intensive development that takes into account scientific and technological progress and innovation gives rise to entirely different proportions and different strategies. One of the expected constants of the 21st century should be the population of the Earth amounting to 11.6 billion people (*Kapitsa, 2010, p. 67*). By a strange coincidence, it is precisely by this time that scholars expect to unravel the enigma of human longevity and the possibility of extending it to at least 150–160 years.

Here the author should like to express a heretical thought that may provoke an ambiguous reaction from critics. Yet it is very important to know this when modelling the society of the future. It consists in the fact that human needs must be distinguished qualitatively and quantitatively. Quantitative needs are certain norms that ensure the normal—i.e., at the given historical level—existence of society as a whole and of each individual in particular. These are norms in nutrition, clothing, housing, transport, and services. Qualitative needs are the diversity of ways of satisfying normalised needs.

Thus, quantitative needs have their capacity and limitation. Moreover, the world economy has already achieved the possibility of providing for this capacity. The limits of qualitative needs are not yet visible to us. However, as a hypothesis, they also exist. Probably this boundary is not only economic but also moral-psychological. One of the most boundless branches of needs is the need for luxury. However, it is by no means excluded that (and this we can indeed sometimes

observe) luxury in certain of its manifestations becomes immoral and loses its position. The cultural development of society may well put a final limit to this.

Such an approach puts a cross through the basic foundations of "economics". It requires a revision of, and even a rejection of, theories of economic growth. It gives hope to millions for a real possibility of a dignified existence.

Let us approach this question from the standpoint of the theory of marginal utility. Let us recall the illustration of this principle: suppose you do not have a suit. The purchase of the first suit will bring you genuine pleasure. The second suit will please you to a lesser extent. The tenth suit will leave you almost indifferent. When suits fill your flat, you will realise that you are thereby losing a resource more important to you—free space. Economists, from this example, attempt to derive the value of each newly acquired suit. For us it is important to grasp that needs are in fact not boundless and have their own quantitative limit. The economy is not a bad infinity of contradictions between boundless needs and limited resources. In reality, the economy is a particular historical stage of solving the problem of the deficit of resources in relation to the existing limited needs.

We are far from socialist ideas of egalitarianism. Quality, the prestige of consumption, is society's price for the individuality of its members. According to the estimate of Prigozhin, people spend from 60 to 90% of their incomes precisely on prestige consumption (*Prigozhin, 2010, p. 62*). To a great extent this is imposed by advertising, which reflects, as vividly as possible, the prevailing demand-driven economy.

The complexity of the issue lies in the fact that there is no such thing as "the economy" in general, the economy as an abstraction. Apart from spatio-historical frames, in order to establish the critical quantitative parameters of a particular system, it is important to know its target orientation and the set of means it employs to realise this orientation.

The economy may, for example, have a social orientation and yet pursue this task through constant borrowing. These are one set of parameters. The economy may be militarised. That is a different case. The economy may be bureaucratic-oligarchic, as it is at present in Russia. Its principal economic supports are two factors: corruption and the tax system, entirely placed at the service of these two social strata. Both of these factors have quantitative limits; once exceeded, the system will collapse irreversibly. Yet it is precisely these quantitative limits that the system protects with the greatest zeal. In addition to the monetary sum of corrupt incomes, there may be included here the costs of maintaining the security apparatus, of maintaining propagandistic mass media, and so forth.

Thus, by transition to a new quality within the framework of dialectics we understand a certain progressive action, a certain new quality of a higher level than before the transition. However, it should be recognised that this is rather the exception than the rule. In the majority of cases this is followed by the destruction of the system, chaos, stagnation, crises, catastrophes. When designing and setting goals for the future, a situational model is always required that makes it possible to forecast qualitative changes conditioned by our quantitative growth.

So, to sum up. Quantitative characteristics, constants are nothing other than the objective law of the existence of systems. Any system forms quantitative constraints as an element of homeostasis, as a means of protecting its existence. Constants "forbid" the elements of the system, its separate structures, to violate system-forming proportions; they "forbid" their

hypertrophic development, the formation of so-called "cancerous tumours". The absence of such constants is the inevitable death of the system. The violation of these constants is an inevitable systemic crisis. The limitation of quantitative growth is ensured by the feedbacks of the system, the consideration of which does not fall within the remit of this article.

However, we have approached the threshold beyond which it is necessary to consider how homeostasis turns into its opposite—chaos. But since the laws we shall consider further are oriented to a greater extent towards development than towards stability, we cannot proceed to further research without clarifying yet another question, namely, what should be understood by development. What are its criteria?

It must be acknowledged that philosophy is very non-specific on this question, vague and contradictory. Lenin's definition of development resembles more a certain sketch for future research: "Development, as it were repeating the stages already passed, but repeating them differently, on a higher basis ('negation of the negation'), development, so to speak, in a spiral, and not in a straight line; development by leaps, catastrophically, revolutionarily; 'breaks in gradualness'; the transformation of quantity into quality; internal impulses to development given by contradiction, by the collision of various forces and tendencies acting upon a given body or within the limits of a given phenomenon or within a given society; interdependence and the closest, indissoluble connection of all sides of each phenomenon (and history reveals more and more new sides), a connection that gives a single, law-governed world process of movement—such are some features of dialectics as a more substantive (than the ordinary) doctrine of development." (*Lenin, n.d., p. 55*)

Of the more modern definitions, at least striving for a certain rigour, we have managed to find the following: "Development is an irreversible, directional, law-governed change of material and ideal objects. Only the simultaneous presence of all three indicated properties distinguishes processes of development from other changes: the reversibility of changes characterises processes of functioning (the cyclical reproduction of a constant system of functions); the absence of law-governedness is characteristic of random processes of a catastrophic type; in the absence of directionality, changes cannot accumulate, and therefore the process is deprived of the single, internally interconnected line characteristic of development. As a result of development, a new qualitative state of the object arises, which appears as a change in its composition or structure (i.e. the emergence, transformation, or disappearance of its elements or connections). The capacity for development constitutes one of the universal properties of matter and consciousness." (*Yudin, 1981*)

Yet even in this definition, almost every word raises questions. "Irreversible"—ageing, withering, destruction are irreversible processes, but are they development or not? "Directional"—directed by whom/what, where, towards what? Quantitative accumulations are reversible. But why should this not be development? And so on. We know of no other way to escape this vicious circle than to turn to General Systems Theory.

However, even in this theory new approaches are required. To examine the problem of development, in our view, it is necessary to divide all systems into monogenetic, polygenetic, and integral.

By the first we should understand such systems as can be described by a single life cycle from the date of their emergence, birth (even if conditional), to their demise. Monogenetic

objects are relatively autonomous, and their temporal life cycle is comparatively short and amenable to observation.

Polygenetic systems unite not only a multitude of monogenetic systems into a single whole, but their life cycle includes the succession of generations of monogenetic systems, their modification, transformation, the emergence, as a result of their vital activity, of new monogenetic systems.

Integral systems may also be called multi-polygenetic; they unite the entire set of monogenetic and polygenetic systems within the boundaries established by the researcher in studying systems of a given complexity, which within these limits may be considered integral.

Any definitions, especially those made for the first time, suffer from inaccuracies, incompleteness of coverage, ambiguities, and other shortcomings. Therefore, we shall proceed in our research from what is at hand.

Thus, as an example of a monogenetic system we may consider a grain of wheat. From the outset it possesses a certain genetic code, thanks to which, when planted in the soil and given certain conditions of care, it has entirely definite stages of development, ripening, and withering. The same may be said of an individual human being or any representative of the animal world. This logic undergoes no serious changes in relation to technical artefacts.

Here the genetic code is the design documentation. Geology allows us to assert a similar logic of development with respect to objects of mineral origin. It is more difficult with objects of cosmic scale. Nevertheless, our knowledge admits the existence of life cycles for stars, planets, black holes, comets, and other cosmic objects.

The life cycle of a monogenetic system includes the process of formation, stabilisation, withering, and death. In general, this is the development of the system. Thus, it may be asserted that for monogenetic systems development means a complex of processes from birth to dying (liquidation, transformation). The degradation of certain functions of a system may be connected not only with the demise of the system as a whole, but also locally, providing development (clearing the field) for other functions that are more important at a given stage of the object's existence. For example, the appearance of mobile telephones led to the degradation of the postal service in the form in which we previously knew it.

The life cycle of monogenetic systems may be conventionally divided into periods of development and degradation. At the same time, depending on the object under study, there may arise problems of extending the life cycle or of its utilisation before degradation processes arise. The utilisation process must also be included within the bounds of the life cycle. This is especially important when creating technical systems. Otherwise, planet Earth is threatened with turning into one continuous dump of waste. No production can be initiated if the cost price of the object does not consider its utilisation. At present, the producer strives to shift this problem either onto the consumer, or onto municipal services, onto society. And the issue is not only upon whom these costs fall. The producer becomes indifferent to how technologically feasible the dismantling of the object is, what materials are used in creating the object from the standpoint of the expense of their utilisation and their harmful impact on the environment.

But the world around us is not mono-, but multi- and polygenetic. At the end of its life cycle, a grain produces an ear with dozens of new grains, of which, at least some, may differ to a greater or lesser degree from the original grain as a result of adaptive changes, or as a result of

specific cross-breeding, pollination, grafting. In animals and humans, children are born. Despite all their similarity to their parents, they are distinctive, and the conditions of their existence sometimes change radically.

Most importantly, in analysing development, everything that is newly arising must be considered as a community, as an integral aggregate, and not as autonomous objects. But the highest rates of change can be observed in the technical sphere. Old technical artefacts, together with the growth of human knowledge, give rise to new technical artefacts.

Moreover, genetics and biotechnology today intervene in the life of the plant and animal world, producing that which was not envisaged by the natural process and likewise accelerating the process of variability. That is, these new communities must be considered historically and in the process of variability. Only thus can we identify the law-governedness of their development.

Integral systems include different mono- and polygenetic (homogeneous) systems. Their interaction is determined by a large number of elements and structures, and hence by a large number of interrelations. Accordingly, their study appears more complex.

The life cycle of polygenetic systems is longer than that of the monogenetic systems that form their elemental composition. At times it is difficult and even impossible to trace their emergence and disappearance, yet it is beyond doubt that such reference points always exist. As we shall see further, the life cycle of such systems is divided into definite phases and intermediate cycles. But each system is specific and individual, and therefore requires individual study.

Thus, one of the most significant and observable forms of development is the life cycle of an object, which we call monogenetic. In more complex systems we may observe the life cycles of polygenetic and multigenetic objects. Their development may be divided into generations, populations, alternating phases corresponding to definite characteristics. While allowing for a certain diversity, nature is inclined to duplicate the objects it creates. Therefore, the demise of some structures usually does not lead to catastrophic consequences, and development is ensured by other structures.

Chaos

In the scientific literature, chaos is multifaceted. It may denote a certain disorder of ongoing processes; the multivariance of development; the impossibility of predicting the future under the influence of random and unpredictable events; deviations in development resulting from minor external effects; processes of entropy; and many other phenomena.

We, but regard chaos exclusively as the *philosophically paired category* of the concept of *homeostasis*. This means that chaos is any process that violates the constants of homeostasis and disrupts the life cycle of a system, leading either to its destruction (death) or to processes of its degradation. We would designate the degradation of systems as *entropy-type chaos*.

Formulation of the *sixth law*: any chaos has its limits, and upon reaching them tends toward ordering and the formation of a homeostatic system.

The existence of universal chaos may be referred to the phenomenon of the Big Bang. But was there only one Big Bang? Or are these local cosmic events related to the existence of black holes? We do not know what serves as the "trigger" for the formation of black holes. We do not know the processes that occur within them. It is not excluded that these processes generate

new matter to replace that which has been lost in the course of entropic processes. We do not know what the critical mass of a black hole must be for a Big Bang to occur. If there was only one Big Bang, it must be assumed that the life cycle of our Universe will end with a Big Contraction.

Then the enigma of *dark matter* becomes clear: our Cosmos must have a certain centre in the form of a Global Black Hole around which all galaxies revolve. Its gravitational force makes the Universe finite in size and prevents the constellations from "dispersing" irreversibly.

Naturally, the question arises: "Why do we not see it?" There are two specific reasons. The first is that our Universe is so vast that the telescopes at our disposal allow us to observe only a small portion of what it truly represents. The second reason is that the light of stars and nebulae prevents us from seeing that which is intended to absorb light rays.

Thus, let us acknowledge the theory of the Big Bang and the generation of universal chaos by it. In all other cases, any chaos is always *local* in nature. It occurs within the framework of a more powerful homeostasis, is subordinate to it, and is subject to stabilisation. The text in italics constitutes the *seventh universal law*. Nevertheless, we have not yet reached either the causes of chaos or its essence.

Destruction and death of systems are possible in four cases:

1. Direct (vicious) links escape the system's control and are not neutralised by feedback. The system runs amok.
2. The system perishes *slowly* as a result of entropic degradation processes.
3. Each system in the course of its development generates within itself *anti-systemic* elements and processes. Sooner or later these processes reach a *bifurcation point*. The chaos caused by these processes has multiple possible outcomes. It may lead either to the elimination of anti-systemic elements or to the suppression of the processes they have provoked. In that case, the system not only preserves its previous form but also strengthens itself. However, if the anti-systemic elements contained within themselves the novelty necessary for the system's development, their destruction or suppression is fraught with the degradation of the system and its entropic extinction. Yet anti-systemic elements may also prevail. Then a new system arises, possessing new properties. Finally, a new system may form with any combination of interconnected elements that, in the preceding system, were antagonists.
4. External impact. Here everything depends on the strength of that impact. The system may withstand it and thereby reinforce itself against future similar impacts, or it may perish.

In all four cases, material systems as a rule preserve their elemental composition, which passes into new systems. The interrelations, however, change radically. The rupture of systemic interconnections and the "search" for new interactions define the essence of chaos. The number of ruptures and their qualitative significance in the old system determine the degree and variants of its ultimate outcome.

What, then, is chaos? A necessary link in the process of development, or an obstacle to it?

First of all, chaos introduces into the process of development an element of uncertainty about the future. Chaos may be caused by processes occurring in the past and be the result of their evolution. However, chaos may also result from the influence of the future—from its inevitability and even from the subjective awareness of it. Nor is it a logical error to understand that the past and the future actively meet at the *bifurcation point* of a system. Chaos may terminate

the life cycle of a system, yet even in this case it remains an element of development, clearing the way for the new. And it may contribute to the continuation of the life cycle, imparting to it a new impulse.

Laws of the Variability of Matter

With this section, we begin our rethinking of the well-known dialectical laws. When speaking of the variability of matter, Hegel—and following him, Marx—acknowledged only the transition from quantity to quality. The transition from quantity to quality can be divided into two processes, or two types of variability: quantitative changes and the qualitative changes associated with them.

The well-known systems theorist Urmantsev formulated the *Fundamental Law of the General Theory of Systems (GTS)*, according to which there exist only four fundamental transformations of an object-system: identical (*T*), quantitative (*Ql*), qualitative (*Q*), and relative (*R*).

The relative differs from the identical in that in the former case we obtain systems similar in size and composition but differing in internal structure, whereas in the latter such differences are absent. In my understanding, the concept of relative change of systems is rather debatable when it comes to the transformation of matter. Nonetheless, we shall accept this proposition as true, since either interpretation does not affect our conclusions. Yet the very formulation of the problem prompted me to further inquiry. Time and practice will demonstrate the correctness of Urmantsev's assertions.

From this is derived the *Central Proposition of the GTS*—or the *Basic Law of Systemic Transformations*. According to it, an object-system, in accordance with the laws of composition, may transform: (a) into itself through an identical transformation, or (b) into other object-systems through seven—and only seven—distinct transformations (*Artyukhov, 2014, p. 16*):

- Quantitative (*Ql*)
- Qualitative (*Q*)
- Relational (*R*)
- Quantitative and qualitative (*QlQ*)
- Quantitative and relational (*Ql*R)
- Qualitative and relational (*Q*R)
- Quantitative, qualitative, and relational (*QlQ*R)

However, such an approach resembles arithmetic at the level of the first years of schooling, where one is not yet aware that, apart from addition and subtraction, there also exist multiplication and division—not to mention transformations known to higher mathematics. The point, well-known today and requiring no revelation, is that matter can exist simultaneously in various hypostases.

For example, any mass of a solid, liquid, or gaseous body possesses a gravitational field. That mass may also possess a magnetic field. Changes in mass entail changes in the gravitational field, while a magnetic field may shift its poles for reasons unknown to us—or even disappear altogether.

Furthermore, a photon can behave alternately as a quantum (a particle possessing mass) and as a wave, spontaneously transforming from one into the other. And finally, nuclear reactions, according to Einstein's formula $E = mc^2$, transform mass into energy.

In all these cases we are dealing either with *dual interdependent qualities* or with a *direct transition* from one quality to another without quantitative or relational change. Therefore, we insist on including an *eighth transformation*:

- Change of interrelated properties (*Q–Q* of properties) — when an object-system is the bearer of several material qualities;

and a *ninth transformation*:

- Direct transition from one quality to another (*Q–Q* of object) — when one form of matter passes directly into another, changing the object-system itself.

Moreover, all the transformations listed above do not encompass *genetic changes* in biological systems. These occur in two variants:

- Vegetative, when from one seed we obtain a multitude of fruits, each bearing genetic differences that distinguish it from its parent fruit (the parent fruit perishing in the process);
- Animal (the terms "vegetative" and "animal" are conventional, since such changes occur in both the plant and animal worlds), when as a result of the crossing of parental genes we obtain offspring with distinct characteristics, while the parents continue their existence.

But even this is not all. The first two transformations we have indicated imply both direct and reverse transitions. Yet in a considerable portion of the transformations of systems or matter we encounter *irreversible processes*; this (excluding the first point—transformation into identity) increases the list of transformations by another nine positions, bringing their total to *over twenty forms*.

The list of quantitative and qualitative transformations—numbering at least twenty—does not, in our view, exhaust the range of possible changes in material systems, if only because it includes only *monogenetic systems*. Transformations of *multigenetic* and *integral* systems—among which the social system is included—require entirely different approaches:

- firstly, because in them changes are fixed over time through the succession of generations;
- secondly, because they are of a more complex character, implying the tracking of transformations throughout the entire life-support system.

Thus, we have reached the understanding that more than twenty forms of material change are known to us, and that this list can and should be expanded. The first thought that arises is the need for a *theory of the transformations of matter* with its classification (physical, chemical, biological, social, etc.). Yet in philosophical terms this is not the principal question. The essential question is whether, from this list of transformations, we can distinguish those that are characteristic of development.

And here we are ready to formulate the *eighth universal law of nature*, *society*, *and thought*: no transformation of matter—not even the transition from quantity to quality—can, by itself, determine whether it acts in the direction of *development*, *degradation*, or *homeostasis*. Only by viewing material systems in their entirety, and by understanding their *target functions*, can we determine the direction of the transformations occurring within them.

What does this law tell us? It asserts that no dialectic, without the understanding of the systemic structure of the world, functions independently. Today we can speak of scientific dialectics only as *systemic dialectics*.

The recognition of the multiplicity of forms of material change leads us to yet another law—the *law of quantitative transformations of material systems*. The fact is that elements do not exist

within a system independently. Their presence is ensured by their interrelations with other elements of the system. Even without taking into account the variable nature of interrelations—and the fact that each interrelation, e.g., in society, is characterised by various aspects (economic, political, cultural, etc.)—we are compelled to state that the growth of interrelations outpaces the growth of system elements at a rate exceeding geometric progression.

Let us clarify this by example. If we take two elements, A and B, only two connections are possible between them: A→B and B→A. Adding a third element immediately increases the number of interrelations to six: A→B and B→A, A→C and C→A, C→B and B→C. However, if we allow for the formation of *coalitions*, then two elements can unite to exert joint influence on the third, and the number of possible interrelations rises to twelve (*Dragobytsky, 2013, p. 92*).

If each interrelation is considered as informational, we must note that the *information capacity* of elements is not limitless. By information capacity, we mean the ability of elements and systems to perceive and process a limited amount of information. The response to such informational growth is the *structural division of the system into subsystems*. The quantitative growth of subsystems, in turn, forms a hierarchy. By dividing within itself, the system generates new systems, which in time may acquire independent significance.

Thus, the content of the *ninth law* is quite simple: *the quantitative growth of system elements and the increasing complexity of interrelations lead to the structuring and fragmentation of systems*. This process generates hierarchy.

For social systems, this is not beneficial. A problem arises: how can the pyramid be inverted to avoid hierarchy? In the view of the present author, it is impossible to do so entirely. It is impossible to overturn the entire system without harming its functioning. It can be done only in certain key aspects, preserving the foundations of the established organisation. Namely, by introducing a *political regime of people's self-governance* while retaining governmental structures possessing their necessary degree of hierarchy (*Geltser, 2022, pp. 192–195*).

It is therefore appropriate to turn next to the consideration of the two remaining laws of Marxist dialectics.

Law of Cyclical Negations

In essence, this law recognises the cyclical development of the world. In a broader sense, it represents dialectics *bounded by time*. Having completed the triad, according to Marx, we essentially return to the starting point. We are told that this occurs on a new level—that the world moves along a spiral of progress.

Yet one question arises: why a triad? The fact that a plant emerges from a seed is not its negation. It is, rather, the process of the seed's development, genetically inherent within it. As we have just seen above, this is the integral life cycle of the plant. Negation occurs only at the final stage, with the emergence of new seeds that can already exist independently of the original plant. Negation always presents itself as a *fractal*: the new system differs from the old, yet it always resembles it.

We formulate the *tenth universal law* as follows: *Evolution represents a succession of negations and, at the same time, a sequence of successive alternations between phases of development and changing fractal systems.*

In this sense, the law should bear a different name—we would call it the *Law of Development through Negations*. The sequence of negations often assumes a cyclical character, forming relatively

equal intervals of time that make it possible to produce reliable forecasts of the future. This law is highly significant for the understanding of social development—a matter to which we shall return when examining society.

Systemic negations occur in three forms:

1. Generation of a new system (object): the old system (object) dies away.
2. Coexistence of old and new systems: the old and the new system (object) coexist for some time in interaction. This interaction may take the form of either cooperation or conflict. Over time, the old system (object) ages (degrades) and perishes, while the new one continues to develop.
3. The old system (object) produces its own potential "gravedigger". Becoming aware of this, it begins to suppress the new formation as much as possible, hindering its development and the fulfilment of its purpose. Meanwhile, the old system attempts to perfect itself, thereby ensuring its own viability. Thus, both systems engage in mutual mimicry—a process that may continue for a very long time. As a result, after a certain period, we may obtain qualitatively new systems (objects) of interaction, and accordingly, the expected results of negation will also change—unless a harmonious synthesis of the two occurs.

The Laws of the Unity and Struggle of Opposites

Hegel's philosophy, which drew attention to the fact that the world is not merely a collection of objects possessing certain properties, but a totality of objects existing in definite relations with one another, represented a major step forward in the scientific understanding of reality.

However, both Hegelian philosophy and, later, Marxist thought concentrated primarily on relations of *opposition*, *contradiction*, and *struggle*. Unity, by contrast, was perceived merely as the presence of shared properties, while the very *interaction* and *cooperation* among objects receded into the background.

Yet the functioning of any system presupposes a process of cooperation among its constituent elements—the capacity and willingness of each element to limit its degrees of freedom for the sake of achieving the system's overall effect. Therefore, contradictions are by their very nature heterogeneous. We can divide them into three categories:

1. Contradictions arising from the functioning and development of a system, the resolution of which does not threaten the system itself and even contributes to its strengthening.
2. Contradictions requiring system modernisation through changes in existing interrelations, structures, or elements, without altering the essential foundations of the system.
3. Contradictions incompatible with the existence of a system. The emergence and intensification of such contradictions mark the beginning of a system's crisis. A crisis occurs when these contradictions partially or fully paralyse the functioning of the system.

From the standpoint of the systems approach, relations of unity and cooperation are thus of primary importance, and particular significance must be attached to the organisation of structures and hierarchies that ensure the systematic resolution of contradictions. This is all the more important given the multivariance of the future—the notion of a system's inevitable death is, ultimately, an ideological exaggeration. Even so, the *form of transition* from one system to another may vary greatly—from chaos to deliberate realisation.

The primacy of unity over the struggle of opposites is reinforced by nature itself through its ability to increase systemic complexity. This capacity for *complexification* makes development the more preferable path, turning the laws of thermodynamics into a *special case of self-organisation*.

"It is not entropy that governs the world, but creation! And the symmetry of global development ('the arrow of time') is determined not by the 'principle of entropy growth,' leading to the so-called 'heat death of the Universe,' but by the 'great biological law of complexification,' which permeates matter from proto-particles to galaxies. Entropy is only a special case of the general process—a stage of development, nothing more. Otherwise, whence have all the systems of the world arisen, including ourselves, reading these lines?" (*Artyukhov, 2014, p. 22*)

From the standpoint of modern science, the concept of *opposition* requires specification and refinement. The law in question presupposes not some abstract opposition, but one that may be termed *dissymmetric*, and the phenomenon itself—*dissymmetry*.

This property was first discovered and described in 1848 by Pasteur (*1960*) while studying the crystals of para-tartaric acid. The term denoted that the substance possessed a kind of double asymmetry—a deepened asymmetry. Firstly, the shapes of the crystals themselves were asymmetric; secondly, the elements of simple asymmetry were regularly disturbed. This was the so-called *mirror asymmetry*, where a twin completely reproduced the configuration of a body but in its mirror image—as in human hands or the right and left sides of the face, which, despite their similarity, cannot be superimposed by any rotation in three planes. Crystallographers call such bodies *enantiomorphic*.

Pasteur held that *asymmetry* is a property of inanimate nature, whereas *dissymmetry* belongs to living nature (*Pasteur, 1960, p. 47*). Further research in this field was carried out by Curie, who extended the properties of symmetry and its derivative dissymmetry, by hypothesis and experiment, to all matter—without dividing it into living and non-living.

He also noted that "two media possessing the same dissymmetry are connected in a special way, from which certain physical consequences may be derived…" (*Curie, 1966, p. 96*) Curie compared this process to an equation describing a physical phenomenon: when a change occurs in one part of the equation, a corresponding change arises in another. He classified combinations of symmetries into nineteen families, of which only seven he attributed to *enantiomorphic dissymmetry*.

One of Curie's conclusions states: "When certain causes produce certain effects, the symmetry elements of the causes must appear in the effects. When certain effects exhibit a particular dissymmetry, that dissymmetry must be found also in the causes that produce them." (*Curie, 1966, p. 102*)

It should be noted that the interaction of two symmetrical parts of a system often occurs not directly but *indirectly*. In animals and humans, this is mediated through the nervous system and brain functions. In the economy, the symmetry of the economic space generally divides into *production* and *consumption*, with their interaction mediated by the *market* and other forms of distribution. The dissymmetry of the market is manifested in *supply and demand*.

This property, moreover, permeates the entire structure of the economy. Yet the *mediated nature* of interactions allows influence to be exerted on both parts of the symmetry through the centre of mediation: by producing change in one part, one may expect a response in the other. In doing so, we artificially create asymmetry.

Symmetry, in Urmantsev's General Theory of Systems (*2007*), is regarded as one of the four fundamental classes of stability—and this view is difficult to dispute.

But whence arise contradictions? As the noted conceptualist Nikanorov (*2008, p. 14*) points out, "it is necessary to note that the category of 'contradiction' was introduced phenomenologically; the reasons uniting the fact of the existence of contradictions have not been determined."

In our view, contradictions are exclusively *social phenomena*. Excluding those associated with logic or discourse, what remains is the collision of conflicting interests among individuals or social groups arising in the course of their life activities. The cause of this divergence lies in a particular *social asymmetry*, which, as a result of such collision, must be eliminated (or, in Hegel's words, *sublated*). Hence it follows that social asymmetry is *trisymmetric*, in contrast to biological dissymmetry.

In economics, the third component of symmetry is generally *quantitative*—at least in its primary manifestations. A commodity simultaneously possesses both *use value* and *abstract value*. When brought to market, it confronts another commodity that also possesses a certain abstract value and an entirely different use value. The exchange of these commodities signifies social recognition of the labour embodied in both and the emergence of a new, *market value*—one only indirectly related to their abstract values.

Abstract labour is defined by the time required for production; market price—by market conditions that consider costs, risks, and scarcity. Throughout this process there occurs a collision of diverse interests. Where reciprocal needs exist between the goods exchanged, the question is resolved through the establishment of quantitative proportions of exchange—thus achieving *value symmetry*.

A particular problem concerns *antagonistic contradictions*. It is usually assumed that "resolution" of contradictions means that a solution is achieved through consensus—the contending entities are not destroyed but pass to a higher level in a transformed quality, becoming integrated into a new set of relations, a new system. Antagonism, however, presupposes the potential or attempt to achieve a result through the destruction of the opposing side.

In the economy, this problem may be either local or global. Local problems are typically of an *innovative* nature, when something new replaces the old without affecting the entire system. A pertinent example is the current task of *economic modernisation* in Russia. As we have previously noted (*Geltser, 2010*), such innovation inevitably entails the need to dismantle certain obsolete systemic relations. To mitigate their negative impact, such dismantling requires understanding and specific skill—a task far more complex than demolishing a building, though even construction technology has its safety rules ensuring the structure does not collapse upon the worker's head.

Comprehension and preventive removal of "obsolete" relations and institutions again allow contradictions to be *resolved*, extracting from the old everything that can be carried into the future. Any other approach in economics is largely immoral, as it disregards the lives and destinies of people—factors often omitted from the calculations of "innovators".

The situation becomes far more complex with *global transformations* — those we call *revolutions*. As Nikanorov aptly observes in his article *"Thirty Years of the Development of a Conceptual*

Scientific-Technical Direction in Capital Construction": "Russia… is a historical product of twice refusing sublation." (*Nikanorov, 2002*)

Reckless, careless treatment of its own history, achievements, and gene pool has relegated the country to the ranks of third-rate economies.

Yet one cannot agree with Wasserman's assertion that "however criminal power itself may be—its overthrowers are far more criminal." (*Vasserman, 2012, p. 238*) The argument is that the fall of totalitarian regimes brings destructive consequences for society. This is natural: totalitarian and authoritarian regimes are extremely unstable systems. They rest on the authority of a narrow group of individuals reinforced by the state's security apparatus, a mendacious ideology propagated through media monopolies, and a judiciary—or its absence—that disregards universal legal norms. Such systems are so unstable that the destruction of one of these supports leads to the collapse of the entire structure within two or three days. The formation of a new state order, by contrast, requires months or even years, and the country often passes through chaos and bifurcations, resulting in power being seized not by those who overthrew the criminal regime but by new tyrants—making the departed totalitarianism seem almost a blessing.

Nevertheless, it takes a person of considerable cynicism not to discern *cause* from *effect*. It is not resistance to totalitarian (criminal) regimes that breeds social calamities, but their prolonged existence. The sooner and more decisively such a regime is destroyed, the greater the hope for a smoother transformation.

At times, such regimes can evolve more effectively through *reform from above*, as in China; at other times, change occurs through *external intervention*, as with the occupation regime in Germany after 1945. Yet to blame the victim for resisting murder, robbery, and violence—and to brand the victim more criminal than the perpetrator—is, at the very least, profoundly unethical.

To resolve fundamentally the problem of *resolving antagonistic contradictions*, it is necessary to ensure that totalitarian and anti-democratic regimes are recognised under international law as *illegal* and *illegitimate*—and, under certain conditions, subject to *forcible dismantling* under international supervision.

Let us make a reservation at the outset: the examples of such dismantling in Iraq (2003) and Libya (2011) are unsatisfactory to all. Procedures must be established that ensure:

1. Judicial and legal mechanisms for the removal of dictators from power;
2. Preservation of international obligations undertaken by the state prior to the dictator's removal;
3. Safeguarding of economic interests of all countries that had previously cooperated with that state, both before and after the regime change;
4. Procedures for the transfer of power to democratic regimes;
5. Rules for the use of force in the event that the above requirements of the international community are ignored.

Solntsev identifies three possible modes of resolving contradictions:

1. Destruction of a contradiction—that is, its integrity is removed through the annihilation of at least one of its elements;

2. Resolution of a contradiction—when the victory of one side does not violate the integrity of the whole, and the elements do not disappear but transform;
3. Sublation (Aufhebung) of a contradiction—the replacement of one totality with a new totality in which both sides of the contradiction are represented (*Solntsev & Rozhkov, 2008*).

Life without contradictions is impossible; yet the forms of struggle and unity may differ, depending both on the *historical period* (how long the growth of problems outpaced attempts at their resolution) and on the *competence* of those charged with making decisions.

Is anticipatory problem-solving possible? Unequivocally, no. Only certain problems can be foreseen, and this requires *situational models* to accompany pending decisions (laws). Unfortunately, in Russia this does not occur: laws are periodically adopted hastily—and just as hastily repealed. Most problems emerge gradually; they must manifest themselves, be studied, and then paths to their solution must be found. Precisely for this reason, *the development of the productive forces will always outpace the perfection of production relations*.

Even so, the origin of *asymmetry* remains largely a mystery to science. Nature appears to *duplicate its actions*, yet does so in a way that *absolute symmetry* is the exception—and, as a rule, manifests as deformity.

As Prigogine asks when examining the DNA molecule: "How does such dissymmetry arise? One common answer is that dissymmetry results from a single event that randomly favoured one of two possible outcomes. Once that choice was made, an autocatalytic process took over, and the left-handed structure generated new left-handed structures. Another answer proposes a 'war' between left- and right-handed structures, in which one destroyed the other. As yet, we have no satisfactory answer to this question." (*Prigogine & Stengers, 2005, p. 144*)

Thus, the *unity and struggle of opposites* testify to the existence within systems of stable, interrelated structures that are, on the one hand, similar to one another, yet on the other, differently asymmetric. These confrontations have a dual orientation: on one side, they ensure the integrity of the system; on the other, they serve as sources of *fluctuations* that lead to instability.

Outside society, this generates *ecological* and *technical* problems; within society, the process manifests as various kinds of *contradictions*. Timely resolution of contradictions, as well as the elimination of problems that generate instability, ensures the *dynamic development* of the system.

The *sublation* of a contradiction implies the conscious formation of new relations and the careful dismantling of old ones. Ignoring social interests leads to the *antagonisation* of contradictions. Yet even the existence of antagonistic contradictions does not necessarily mean that the system is doomed. Between the two options—destruction or evolution—systemic linkages and constants will invariably tend toward *stability*, and therefore favour the latter.

Incidentally, in *technical systems*, just as in natural ones, it is rare for a single problem to cause catastrophe. Systems typically possess *functional redundancy*. Catastrophes are produced by an entire *chain of problems*. Likewise, the existence of contradictions between workers and capitalists does not mean the question must inevitably be resolved by "the expropriators being expropriated" (Marx), nor is imperialism necessarily the "final stage of capitalism" (Lenin).

Nevertheless, the concentration of antagonistic relations is always fraught with *revolutionary destruction* of the system. In this sense, revolutions are not so much the locomotives of history

as its *bulldozers*, generating chaos: "We shall destroy this old world completely, and then…"—and yet, what comes "then" is often known to no one.

Hence the conclusion: the *dialectic of contradictions* requires not struggle but *patient cooperation between opposing sides* to secure development. This assertion is not absolute in its truth. Consider such contradictory unities as *police and criminals*, *drug enforcement agents and narcotics traffickers*. Paradoxically, their fierce struggle often brings them to such proximity that it becomes difficult to tell who is who. Once again, practice shows that such contradictions are most effectively dissolved not through violent confrontation but by *indirect means*—through patient work to create conditions under which one side (the negative one) is deprived of the possibility of existence.

The *General Theory of Systems* posits the *principle of multidimensional thinking* in the domain of contradictions. As Dragobitsky (*2013, pp. 52–53*) interprets it, this principle is the capacity to "see mutually complementary tendencies in directly opposite phenomena and to create a single whole out of seemingly irreconcilable parts."

"In contrast to the Marxist inclination toward antagonism and struggle, the foundation of societal models of development are worth compromising. Compromise represents a point of relative equilibrium, in which the struggle of opposites loses its sharpness (as a result of mutual concessions)." (*Dragobitsky, 2013, pp. 52–53*)

Undoubtedly, a theoretical model is merely an attempt to construct a certain behavioural ideology. The *reality of antagonisms* capable of provoking outbursts of aggression cannot be excluded—but understanding their systemic nature enables the transformation of conflict into structured, evolutionary change.

Discussion

The problem addressed in this study lies in the rethinking of the very foundations of philosophical dialectics. The classical tradition, dating back to Hegel and Marx, was based on the notion of the universal mutability of matter and the progressive direction of development. However, contemporary science has demonstrated that the world is not in a state of continuous revolutionary transformation; rather, it is characterised by periods of stable equilibrium, cyclical fluctuations, and self-regulation. Consequently, philosophy faces the necessity of complementing the *principle of change* with the *principle of stability*.

The principal contradiction of modern dialectics manifests itself between the idea of infinite development and the empirical fact of the limitation of the parameters of existence. The author examines this contradiction through the concept of *homeostasis,* which unites the quantitative and qualitative aspects of the existence of matter. The introduction of the category of homeostasis necessitates a revision of the classical conception of progress, dispelling the dogma of "bad infinity" and affirming the *cyclical nature of evolution*.

The status of *chaos* remains a matter of debate. In traditional understanding, chaos is opposed to order; in *systemic philosophy*, but it represents a *phase of self-organisation*—the moment of transition to a new homeostatic state. Thus, chaos is revealed not as a destructive but as a creative force ensuring the evolution of systems. This view aligns the author's philosophy with the *synergetic* of Ilya Prigogine, yet endows it with a more universal and *metaphysical* dimension.

Another problem concerns the relationship between *systemic* and *teleological* functions of being. Whereas classical philosophy viewed development as the self-movement of matter, *systemic dialectics* introduces the notion of *goal-directedness* inherent in every self-organising system. This makes it possible to explain not only the direction of evolution but also its *internal purposiveness*.

On the basis of the identified problematics, several directions for further development of the topic may be proposed:

1. Philosophy of homeostasis and chaos. The creation of a holistic theory of dynamic equilibrium that unites physical, biological, and social systems. Such a framework could become the *methodological core* of interdisciplinary studies of *sustainable development*.
2. Ethics of systemic equilibrium. The elaboration of an ethical-axiological dimension of homeostasis, in which *values* and *justice* are considered as components of the systemic stability of society. This direction connects philosophy with issues of *social ecology* and *humanistic governance*.
3. Ontology of goal-directedness. The study of the nature of *purpose* as a universal factor in the organisation of being. The development of this line of inquiry could unite *the philosophy of consciousness* with *theories of self-organisation*, imparting to dialectics a renewed *teleological significance*.

Thus, the discussion demonstrates that the study opens the prospect of forming a *new philosophical paradigm*—a *systemic dialectics of limited variability*, in which development and stability, chaos and order, quantity and quality are regarded as interdependent aspects of a single process encompassing matter, society, and thought.

Conclusion

Thus, nature, for reasons unknown to us, duplicates its actions in a *dissymmetric* manner. A significant portion of these symmetries are *enantiomorphic*. These symmetries demonstrate *unity*, and this unity, in turn, reveals a kind of interrelation whereby physical effects on one part of a symmetry produce corresponding manifestations or changes in the other. It is difficult to determine here where *struggle* and *development* lie. In my view, in this way matter resists entropy and thereby sustains its *stability*—its *homeostasis*.

Hence, it is my conviction that the *law of the unity and struggle of opposites* in fact combines two independent laws—the *eleventh* and *twelfth*: the *law of the asymmetric structure of nature,* which ensures the stability of the material world and its resistance to entropy, and the *law of the sublation (resolution) of contradictions (problem-solving)*.

Their formulations are presented below:

11. Nature forms the majority of its objects on the basis of *diasymmetry* (the parts of a whole are asymmetric in themselves, and the elements of simple asymmetry are systematically disturbed). A considerable number of such objects possess *enantiomorphic* (mirror-reflection) properties. The impact on one part of such an asymmetry is, as a rule, reflected in the other part. Interactions between symmetrical parts may occur directly or indirectly (e.g., through the human nervous system). The asymmetry of objects ensures their *stability* and *resistance to entropy*. Other effects of this structural property of matter on development have not yet been established by science.

12. All interrelations in nature and society bear the imprint of mutual influence among objects. In nature, this generates *counteractions* or *coalitions* acting jointly, which in turn encounter opposing forces; in society, these counteractions assume the form of *contradictions*. Counteractions and contradictions differ both in character and in intensity. In terms of their influence on the system as a whole, contradictions (or counteractions) are divided into:

- those not threatening the system itself and contributing to its strengthening;
- those requiring the modernisation of the system through the alteration of existing interrelations, structures, or elements without changing its essential foundations;
- those incompatible with the existence of the given system, termed in science *antagonistic*.

The principal means of *resolving* contradictions in society are the *organisational capacities* of its governance system and *compromise*.

Ultimately, the dynamics of counteractions and contradictions give rise to *direct (vicious) interrelations* affecting the parameters of a system, including its *teleological orientation*. This law activates the *fourth law*—the *law of the nonlinearity of development*—and initiates the operation of the system's *feedback mechanisms*, which in turn sustain homeostasis according to the *first law*.

Thus, the totality of *dialectical laws*, in their interconnection with the *laws of the general theory of systems*, forms a *closed cycle* describing the process of development—"closure" here signifying *wholeness* of the process, not the *finiteness* of the open laws. In generalised form, we might summarise it as follows: *Development, in its broadest sense, can be characterised as the passage of the life cycles of objects (systems) in accordance with the universal laws of nature, society, and thought, which are immanently inherent in the material world and guided by the verified principles of the general theory of systems.*

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Appendix

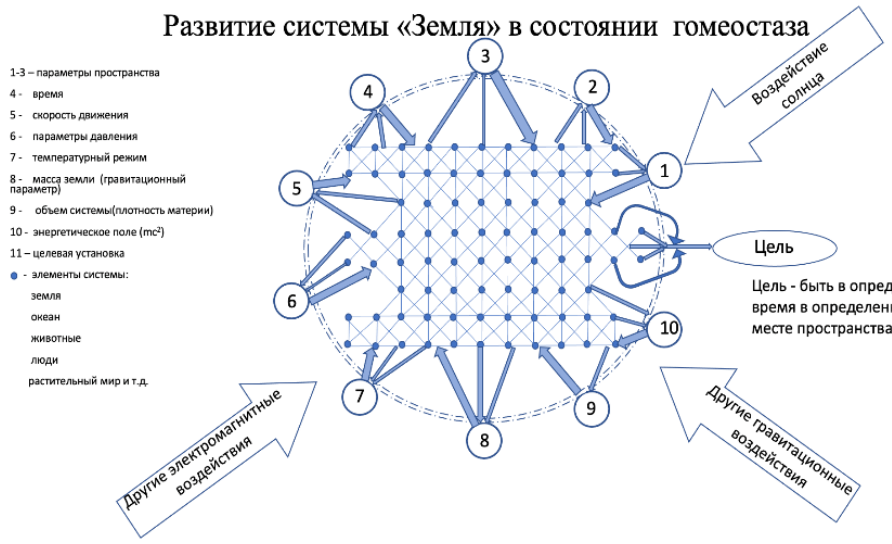

Figure 1. Development of the Earth system in a state of homeostasis (In Russ.)

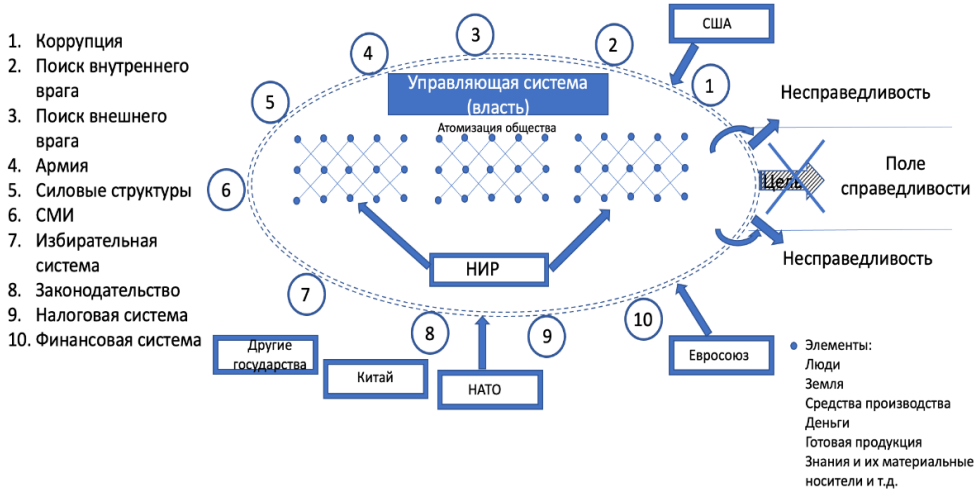

Figure 2. Development of the system "The State in a state of homeostasis and PID activities

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